

Chapter 4

Results

Part 1. Effects of photoperiods and light intensity.

(Exp.1, 2, 3)

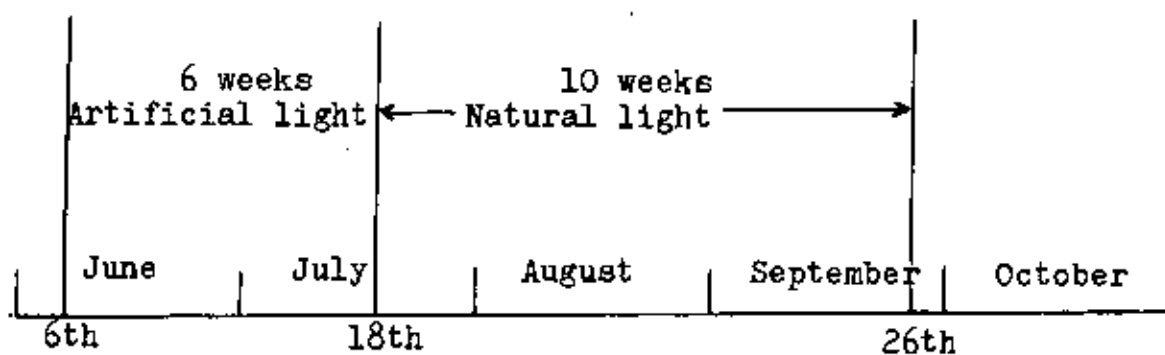
Experiment 1

Chrysanthemum morifolium var. Delaware were used in experiment 1, in which cuttings were made on April 20, 1966; rooted cuttings were planted on May 6, and pinched a week later (May 14). Then in order to keep the plants in a vegetative condition, a natural day length (14½-hour day) plus supplementary illumination (A.L.) from incandescent bulbs all night were used until June 6. To find out the effects of photoperiods and light intensity on the quality of potted chrysanthemums, experiment 1 was started on June 6, and harvested on September 26, five pots of three plants per pot were used for each of the following 6 treatments:

1. 8-hour shaded.
2. 8-hour unshaded.
3. 8+2 A.L.-hour shaded for 6 weeks, and then 10-hour shaded.
4. 8+2 A.L.-hour unshaded for 6 weeks, and then 10-hour unshaded.
5. 8+4 A.L.-hour shaded for 6 weeks, and then

12-hour shaded.

6. 8+4 A.L.-hour unshaded for 6 weeks, and then
12-hour unshaded.



(The above diagram refers to treatments 3, 4, 5, 6)

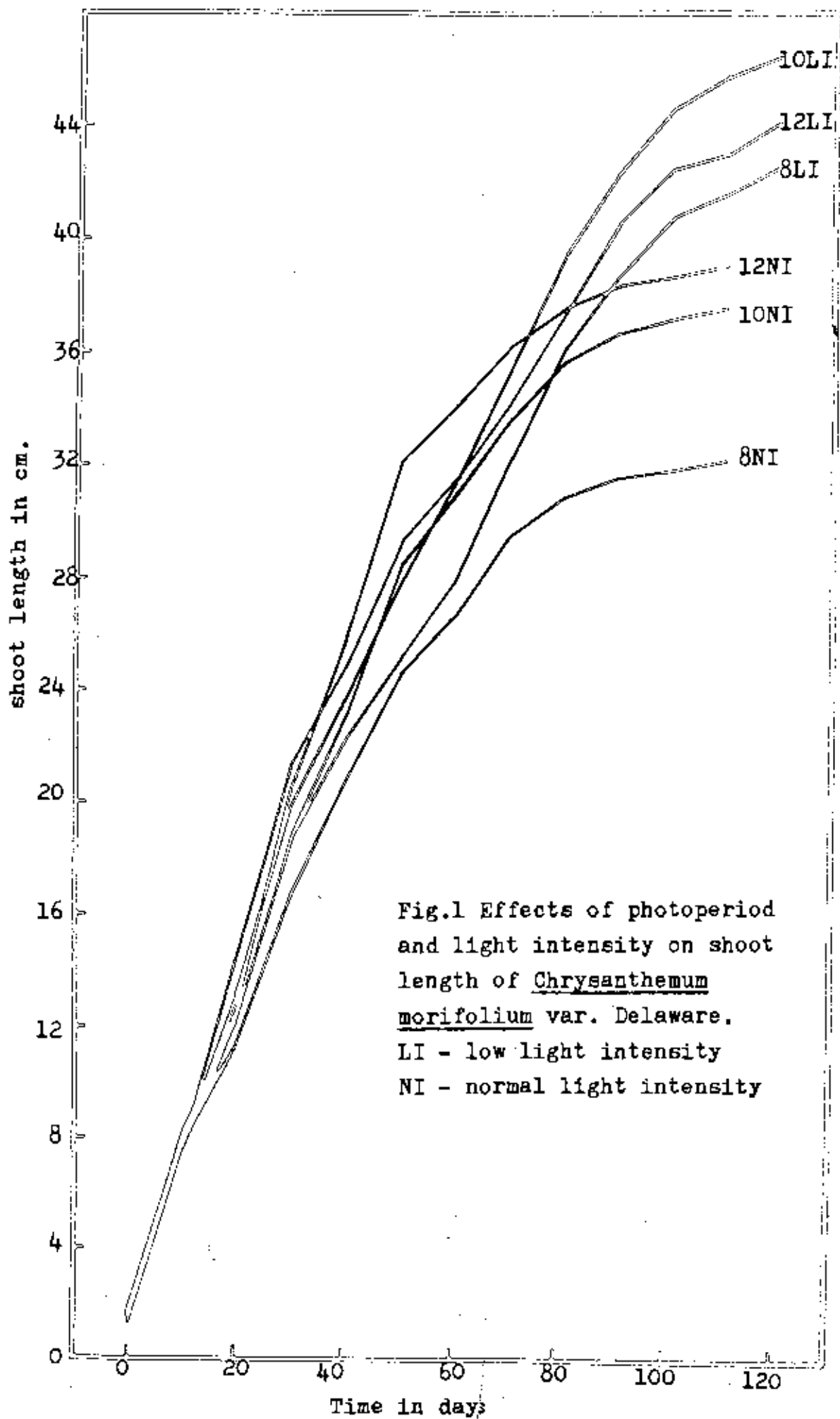
Table 1. Effects of photoperiods and light intensity on the growth and flowering of potted Chrysanthemum morifolium var. Delaware, experiment 1.

Treatment	Ave. shoot length (cm.)	Ave. no. of days to various stages of flowering		Ave. dia. of fl. (cm.)	Ave. no. of ray fls.	Ave. no. of disc fls.	% of ray fls.	Ave. no. of lvs.	
		Flower buds visible	Flower fully open						
1) 8-hour day low light intensity.	42.6	31 (July 7)	89 (Sept. 3)	94 (Sept. 8)	11.4	132	175	43.0	20
2) 8-hour day normal light intensity.	32.2	29 (July 5)	73 (Aug. 18)	81 (Aug. 26)	13.0	159	220	42.0	19
3) 10-hour day low light intensity.	46.4	36 (July 12)	90 (Sept. 4)	102 (Sept. 16)	11.5	118	176	40.1	20
4) 10-hour day normal light intensity.	37.6	29 (July 5)	77 (Aug. 22)	84 (Aug. 29)	13.3	132	211	38.5	19
5) 12-hour day low light intensity.	44.1	34 (July 10)	92 (Sept. 6)	103 (Sept. 17)	12.1	151	170	47.0	20
6) 12-hour day normal light intensity.	39.1	30 (July 6)	79 (Aug. 24)	86 (Aug. 31)	13.0	141	216	39.5	19



Plate 1. Growth and flowering of potted Chrysanthemum morifolium var. Delaware as affected by photoperiods and light intensity. Back row (left to right); low light intensity 8-hour day, 10-hour day, 12-hour day. Front row (left to right); normal light intensity 8-hour day, 10-hour day, 12-hour day.

(Photographed on August 18, 1966)



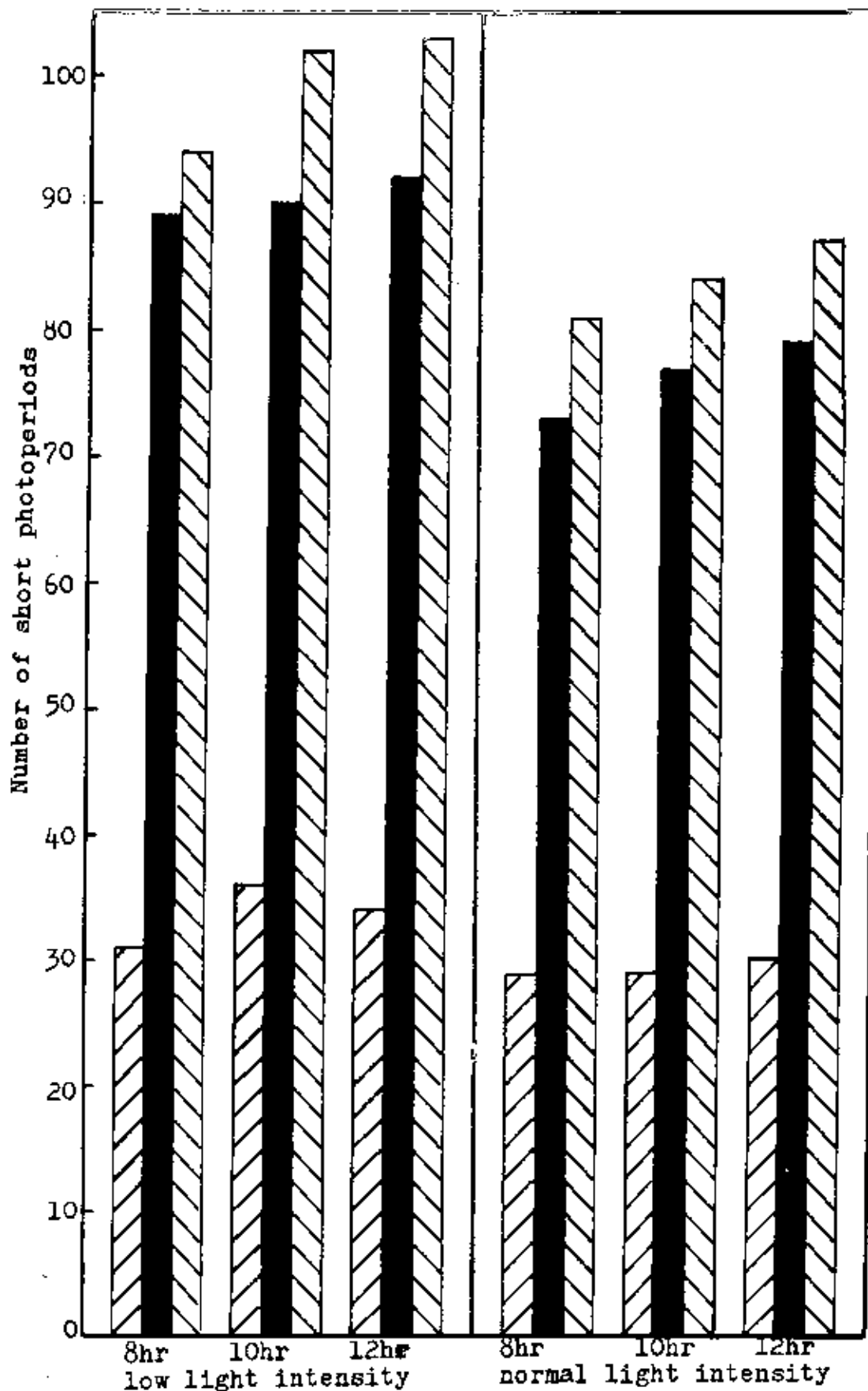


Fig.2 Flowering of potted *Chrysanthemum morifolium* var. Depaware as affected by photoperiod and light intensity.

- ▨ buds visible
- bud color visible, few ray florets opened away from the bud
- ▧ flower fully open

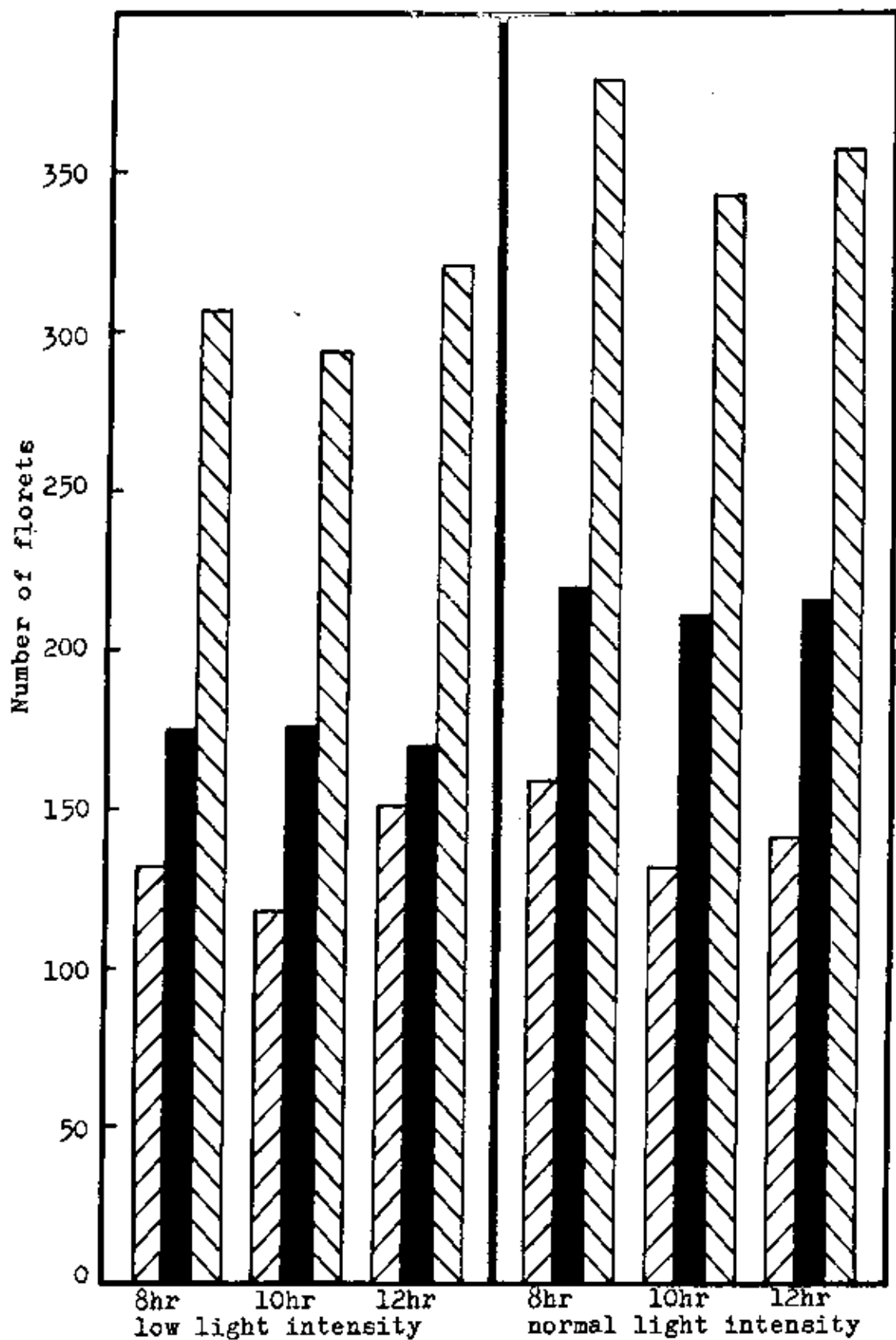


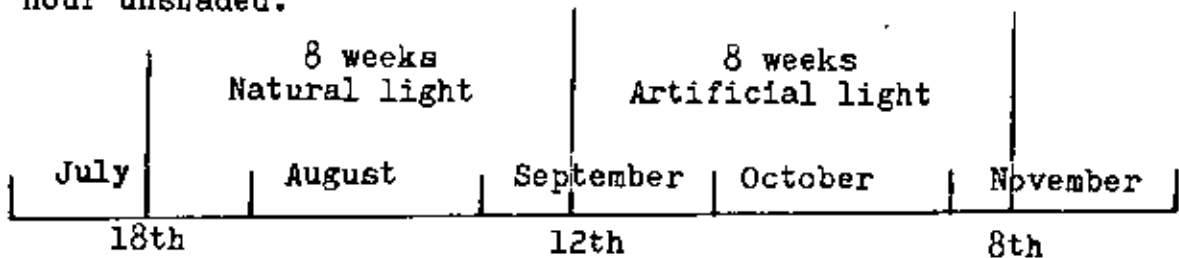
Fig. 3 Effects of photoperiod and light intensity on number of florets of potted *Chrysanthemum morifolium* var. Delaware.

- ▨ number of ray florets
- number of disc florets
- number of total florets

Experiment 2

Chrysanthemum morifolium var. Delaware were used in experiment 2, in which cuttings were made on June 2, 1966; rooted cuttings were planted on June 21, pinched on June 27, and then in order to keep the plants in a vegetative condition, a natural day length (15.10-hour day) was used until July 18. To find out the effects of photoperiods and light intensity on the quality of chrysanthemums, experiment 2 was started on July 18, and harvested on November 8, five pots of three plants per pot were used for each of the following 6 treatments:

1. 8-hour shaded.
2. 8-hour unshaded.
3. 10-hour shaded for 8 weeks, and then 8+2 A.L.-hour shaded.
4. 10-hour unshaded for 8 weeks, and then 8+2 A.L.-hour unshaded.
5. 12-hour shaded for 8 weeks, and then 8+4 A.L.-hour shaded.
6. 12-hour unshaded for 8 weeks, and then 8+4 A.L.-hour unshaded.



(The above diagram refers to treatments 3, 4, 5, 6)

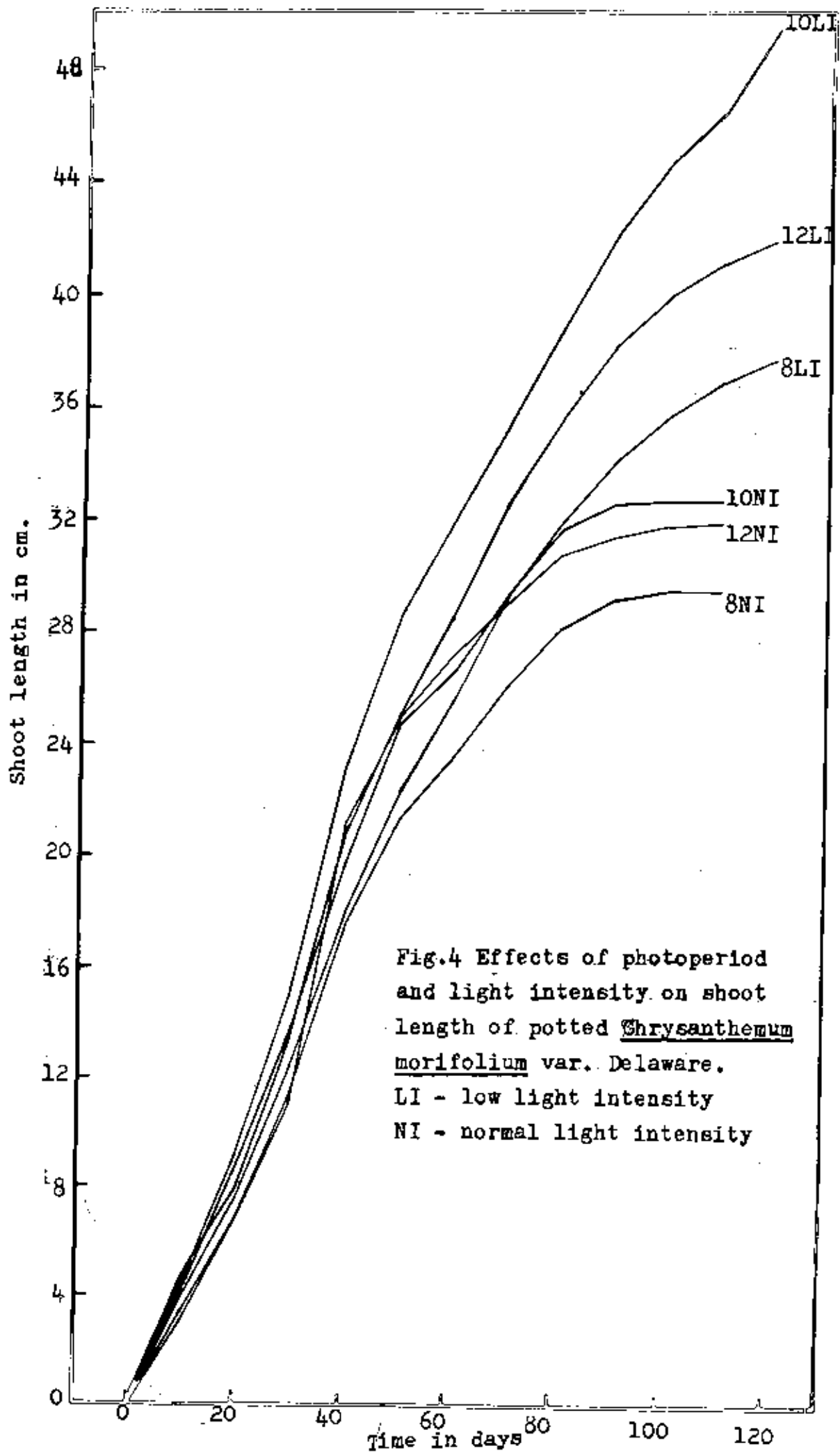
Table 2. Effects of photoperiods and light intensity on growth and flowering of potted Chrysanthemum morifolium var. Delaware, experiment 2.

Treatment	Shoot length (cm.)	Ave. no. of days to various stages of flowering		Ave. Ave. Ave. no. of ray disc fls. fls. fls.	% of Ave. no. of lvs.				
		Flower buds visible	Color visible						
1) 8-hour day low light intensity	37.7	51 (Sept. 7)	94 (Oct. 20)	103 (Oct. 29)	11.7	147	181	44.8	23
2) 8-hour day normal light intensity	29.5	31 (Aug. 18)	80 (Oct. 6)	87 (Oct. 13)	13.0	186	227	45.0	19
3) 10-hour day low light intensity	49.4	45 (Sept. 1)	95 (Oct. 21)	101 (Oct. 27)	11.5	158	204	43.7	23
4) 10-hour day normal light intensity	32.7	28 (Aug. 15)	77 (Oct. 3)	84 (Oct. 10)	11.1	236	250	48.6	19
5) 12-hour day low light intensity	41.9	38 (Aug. 15)	93 (Oct. 19)	98 (Oct. 24)	11.5	188	184	50.5	19
6) 12-hour day normal light intensity	31.9	26 (Aug. 13)	76 (Oct. 2)	85 (Oct. 11)	11.5	284	255	52.7	18



Plate 2. Growth and flowering of potted Chrysanthemum morifolium var. Delaware as affected by photoperiods and light intensity. Back row (left to right): low light intensity 8-hour day, 10-hour day, 12-hour day. Front row (left to right): normal light intensity 8-hour day, 10-hour day, 12-hour day.

(Photographed on October 15, 1966)



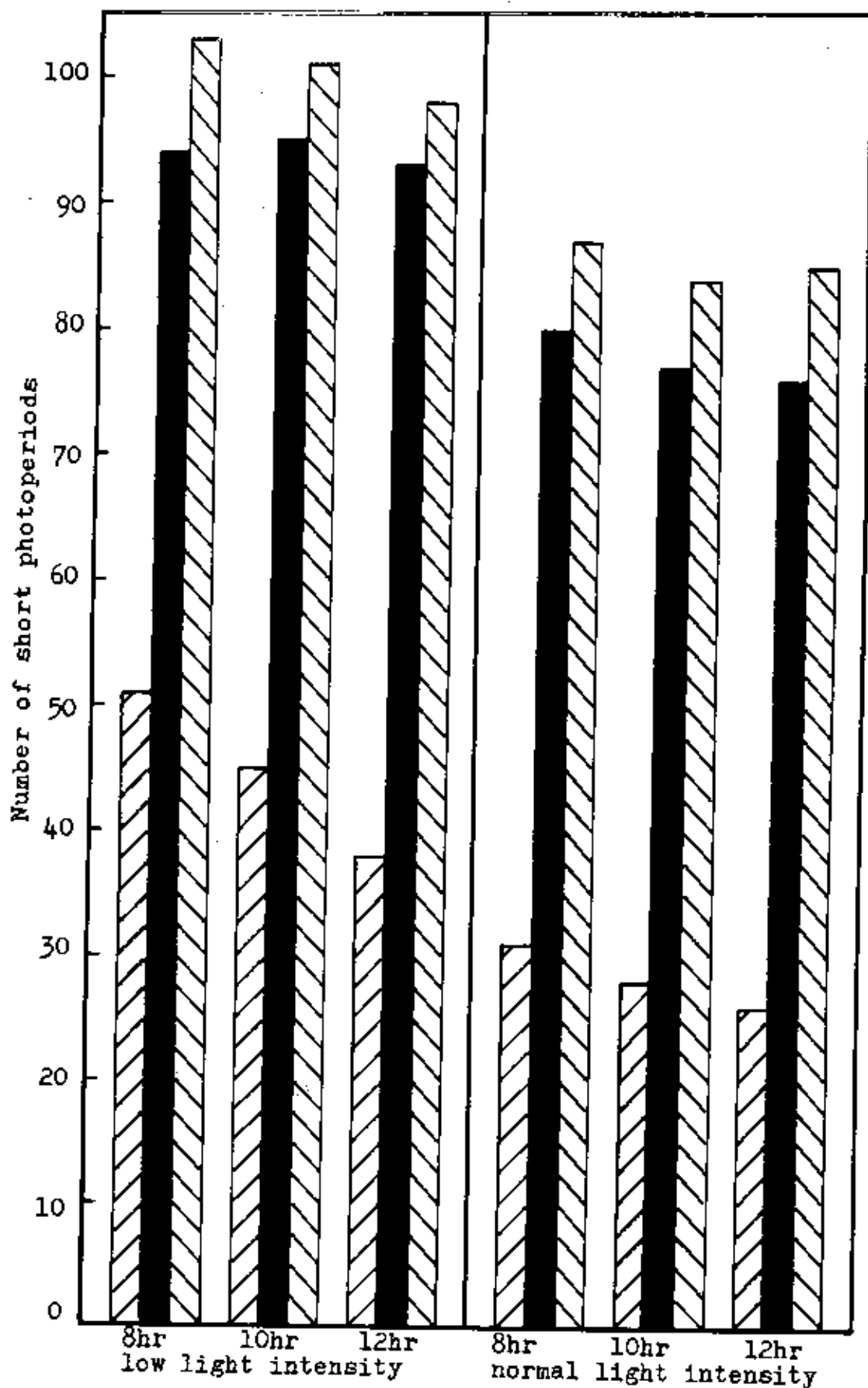


Fig. 5 Flowering of potted *Chrysanthemum morifolium* var. Delaware as affected by photoperiod and light intensity.

- ▨ buds visible
- (bud color visible, few ray florets opened away from the bud
- flower fully open

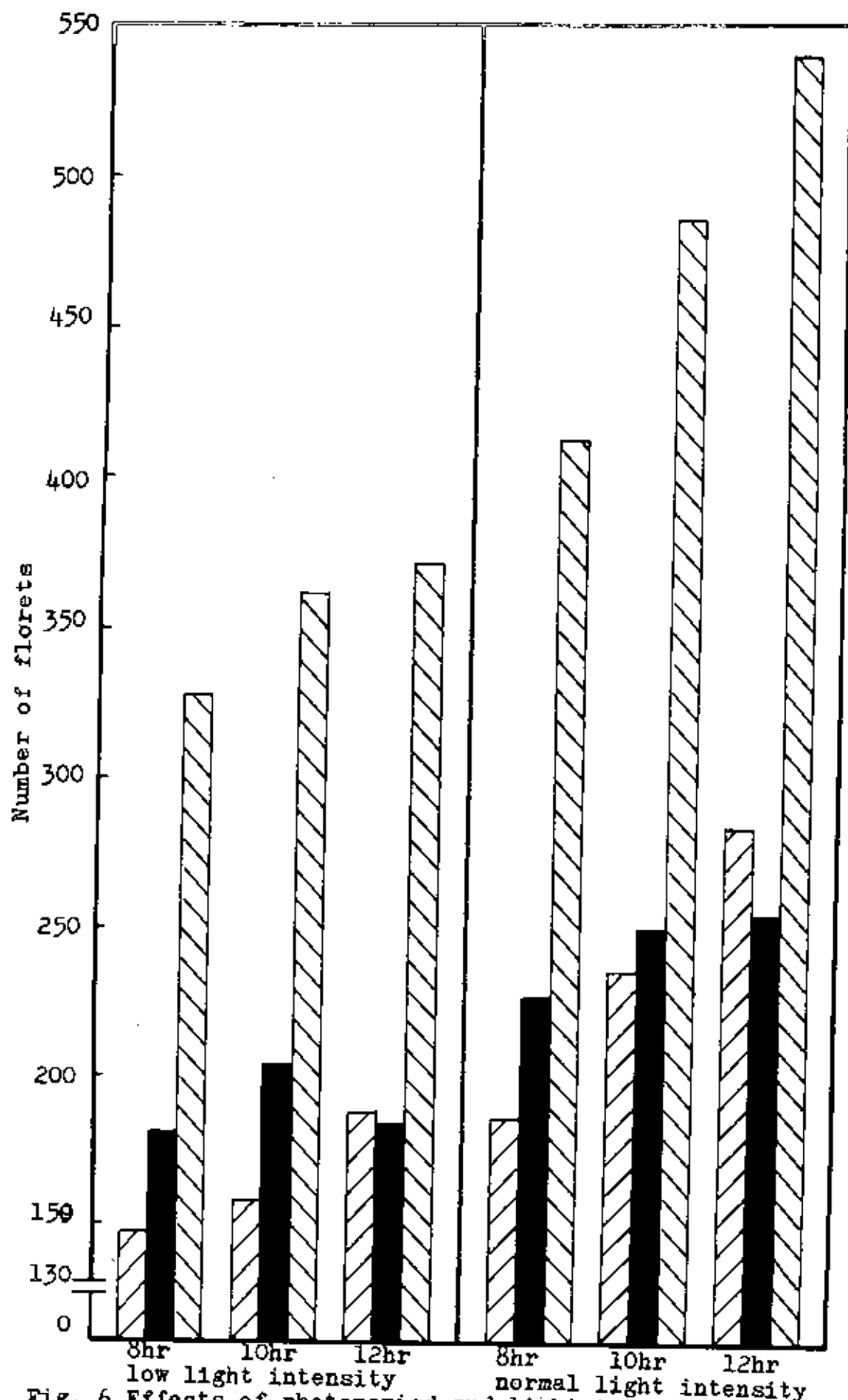





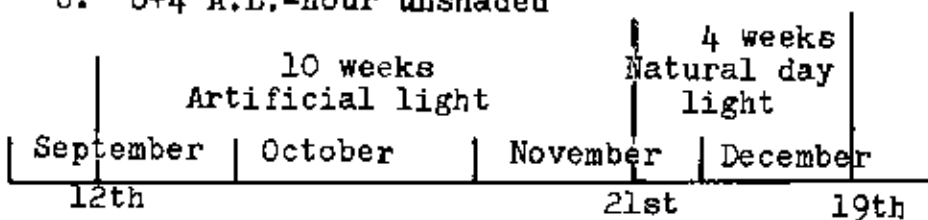
Fig. 6 Effects of photoperiod and light intensity on number of florets of potted *Chrysanthemum morifolium* var. Delaware.

-  number of ray florets
-  number of disc florets
-  number of total florets

Experiment 3

Chrysanthemum morifolium var. Bon Deluxe were used in experiment 3, in which cuttings were made on July 13, 1966; rooted cuttings were planted on August 8, and pinched on August 22. Then in order to keep the plants in a vegetative condition, a natural day length (14-hour day) plus supplementary illumination (A.L.) from incandescent lamp were used all night until September 12. To find out the effects of photoperiods and light intensity on the quality of potted chrysanthemums, experiment 3 was started on September 12. Photoperiod treatments were stopped on November 21, and then the pots were held under the condition of natural day length (10.55 - 10.30-hour day) until the end of the experiment, December 19. Five pots of three plants per pot were used in each of the following six treatments:

1. 8-hour shaded.
2. 8-hour unshaded.
3. 8+2 A.L.-hour shaded.
4. 8+2 A.L.-hour unshaded.
5. 8+4 A.L.-hour shaded.
6. 8+4 A.L.-hour unshaded



(The above diagram refers to treatments 3, 4, 5, 6)

Table 3. Effects of photoperiods and light intensity on growth and flowering of potted Chrysanthemum morifolium var. Bon Deluxe, experiment 3.

Treatment	Ave. shoot length (cm.)	Ave. no. of days to various stages of flowering		Ave. dia. of fl. (cm.)	Ave. no. of ray fls.	Ave. no. of disc fls.	% of ray fls.	Ave. no. of lvs.
		Flower buds visible	Color visible					
1) 8-hour day low light intensity	25.9	29 (Oct.11)	80 (Dec.1)	8.1	222	6	97.4	17
2) 8-hour day normal light intensity	26.8	25 (Oct.7)	67 (Nov.18)	9.6	268	6	97.8	18
3) 10-hour day low light intensity	32.9	28 (Oct.10)	73 (Nov.24)	9.2	252	5	98.0	17
4) 10-hour day normal light intensity	36.7	22 (Oct.4)	60 (Nov.11)	10.3	281	6	98.0	18
5) 12-hour day low light intensity	35.9	28 (Oct.10)	72 (Nov.23)	9.2	271	11	96.1	16
6) 12-hour day normal light intensity	39.2	25 (Oct.7)	70 (Nov.21)	10.2	297	7	97.7	19



Plate 3. Growth and flowering of potted Chrysanthemum morifolium var. Bon Deluxe as affected by photoperiods and light intensity. Back row (left to right): low light intensity 8-hour day, 10-hour day, 12-hour day. Front row (left to right): normal light intensity 8-hour day, 16-hour day, 12-hour day.

(Photographed on November 10, 1966)

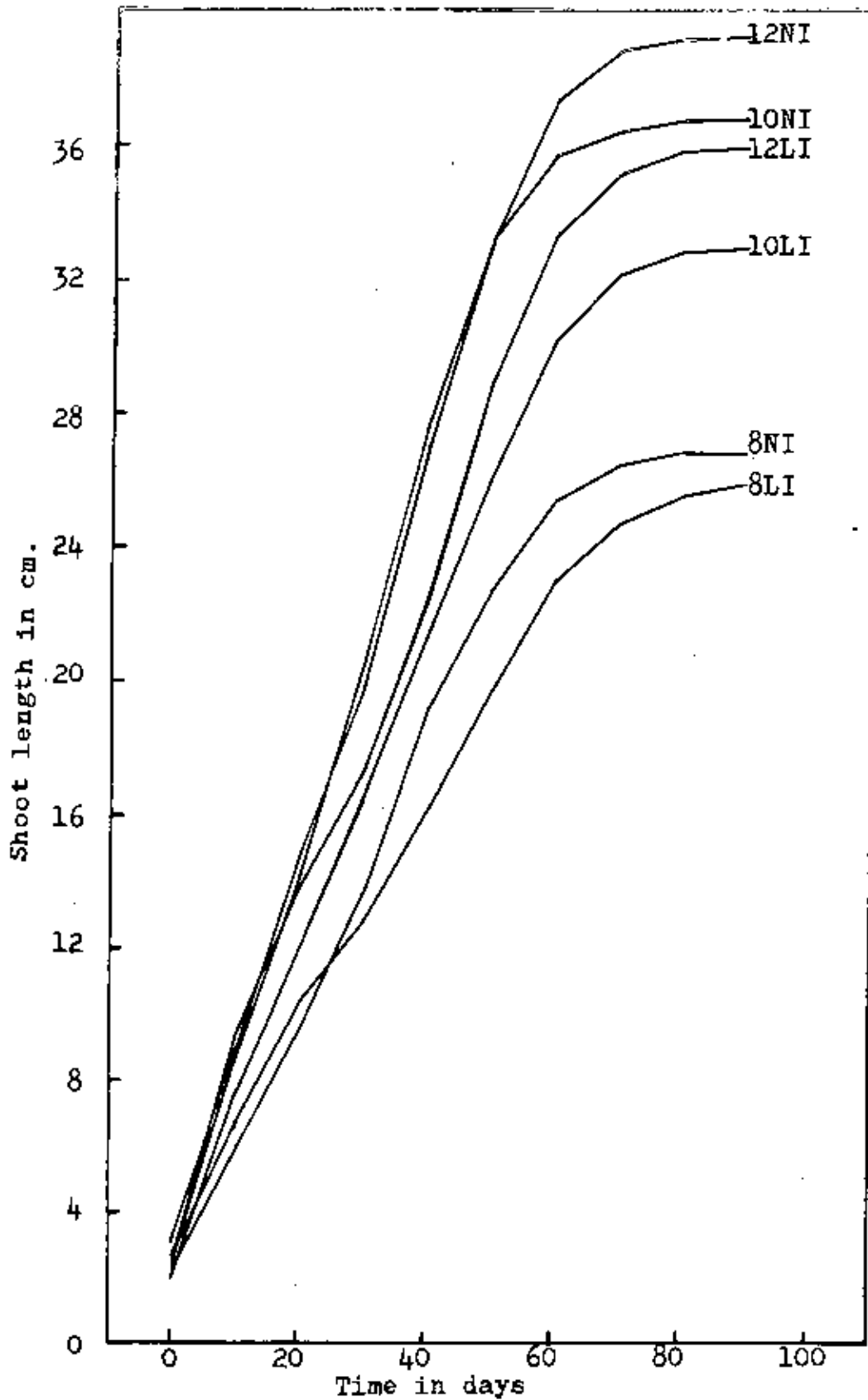


Fig.7 Effects of photoperiod and light intensity on shoot length of potted *Chrysanthemum morifolium* var. Bon Deluxe.

LI - low light intensity
 NI - normal light intensity

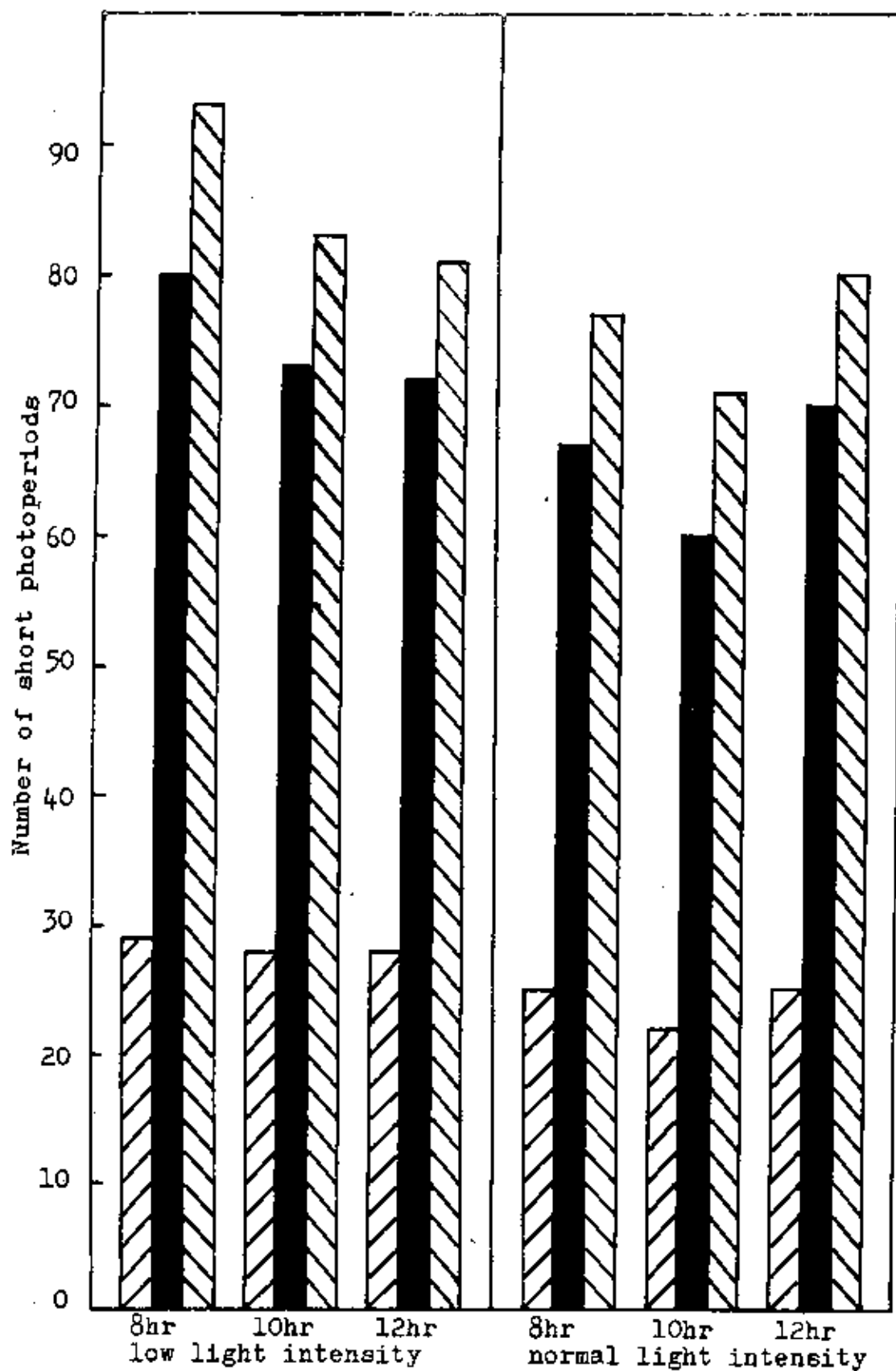





Fig.8 Flowering of potted *Chrysanthemum morifolium* var. Bon Deluxe as affected by photoperiod and light intensity.

-  buds visible
-  bud color visible, few ray florets opened away from the bud
-  flower fully open

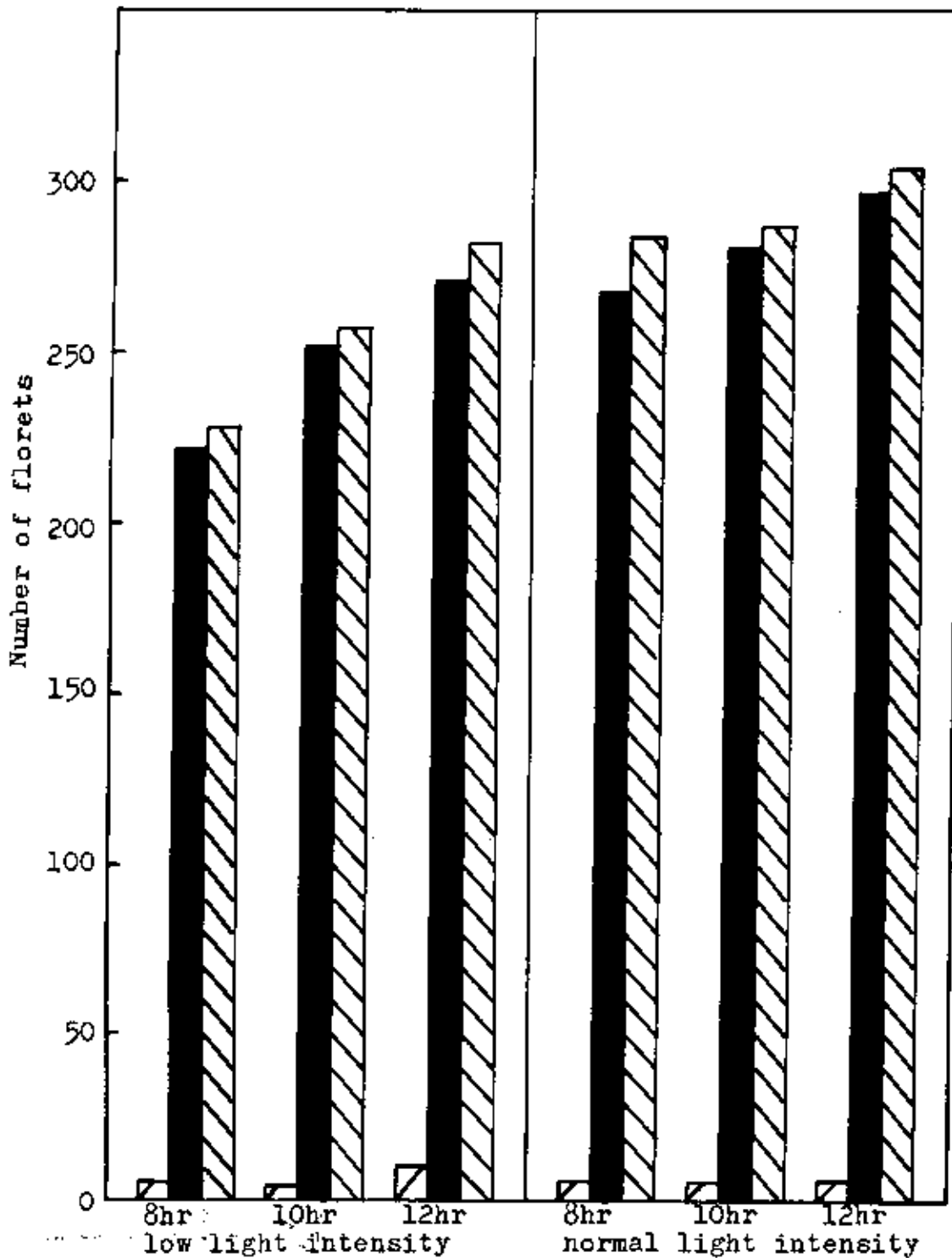


Fig.9 Effects of photoperiod and light intensity on number of florets of potted Chrysanthemum morifolium var. Bon Deluxe.

- ▨ number of disc florets
- number of ray florets
- ▧ number of total florets

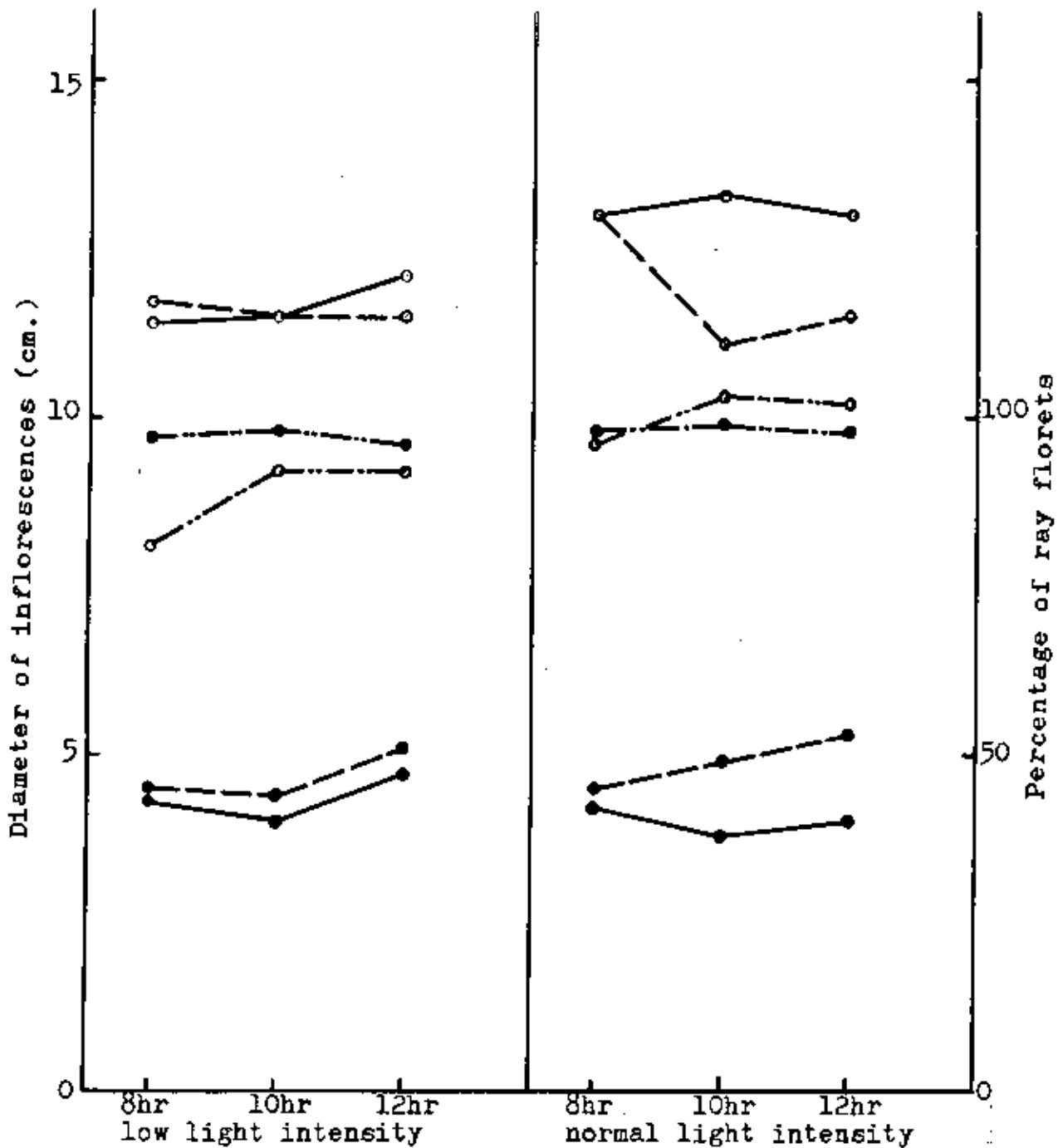


Fig.10 Effects of photoperiod and light intensity on flower quality of potted Chrysanthemum morifolium var. Delaware and Bon Deluxe.

- diameter of inflorescences in experiment 1
- percentage of ray florets in experiment 1
- - -○- - - diameter of inflorescences in experiment 2
- - -●- - - percentage of ray florets in experiment 2
- · · · ·○· · · · · diameter of inflorescences in experiment 3
- · · · ·●· · · · · percentage of ray florets in experiment 3

Summaries of results of Part 1. (Experiment 1, 2, 3)

Effects of light intensity.

1. Plants treated with low light intensity were taller than those treated with normal light intensity and tended to exhibit climbing habits(Figs.1 and 4).

2. In low light intensity treatments, the number of short photoperiods required for flowering increased over those normal light intensity, from 81 to 86 days of normal light intensity to 94 to 103 days of low light intensity in experiment 1, and from 84 to 87 days of normal light intensity to 98 to 103 days of low light intensity in experiment 2 (Figs.2 and 5).

3. The diameter of inflorescences in the normal light intensity treatment is greater than that in the low light intensity treatment, except in experiment 2 where there was little difference in diameter (Fig.10).

4. There is a little difference in percentage of ray florets between low and normal light intensity treatments (Fig.10).

5. There is a little difference in the number of leaves in both experiments (Tables 1 and 2).

Effects of photoperiods.

1. There is a little difference in shoot length

between the 10-hour and 12-hour treated plants, but plants treated with 8-hour are the shortest in all experiments (Figs.1, 4 and 7).

2. In experiment 1, the number of short photoperiods required for bud initiation is nearly the same, but a little late in the 10-hour treated plants in low light intensity conditions. The flowering date is earlier in the 8-hour treated plants than in the 10-hour and 12-hour treated ones in both light intensities (Fig.2). In experiment 2, flower bud initiation and development are earlier in the 12-hour than in the 10-hour and 8-hour treated plants in both light intensities (Fig.5).

3. The diameter of inflorescences in the 8-hour, 10-hour and 12-hour treatments is nearly the same in low light intensity (Fig.10).

4. The 12-hour treated plants have much more percentage of ray florets than the 8- and 10-hour treated plants in both experiment 1 and 2 (Fig.10).

5. There is no difference in the number of leaves (Tables 1 and 2).

Effects of extending short day (8 hours long) by natural and artificial light.

In experiment 1 flower bud initiation occurred in the extended 8+0, 8+2 and 8+4-hour day conditions, and

development in natural light 8-, 10- and 12-hour day conditions. On the contrary, in experiment 2, flower bud initiation occurred in natural light 8-, 10- and 12-hour days and development in the extended 8+0, 8+2 and 8+4-hour days. In experiment 3, both the flower bud initiation and development occurred in the extended 8+0, 8+2 and 8+4-hour day conditions.

1. On bud initiation.

<u>Low light intensity</u>	<u>Number of days to macroscopic visible inflorescence bud.</u>		
	<u>8-hour day</u>	<u>10-hour day</u>	<u>12-hour day</u>
Experiment 1	31	36	34
Experiment 2	51	45	38
Experiment 3	29	28	28
 <u>Normal light intensity</u>			
Experiment 1	29	29	30
Experiment 2	31	28	26
Experiment 3	25	22	25

2. On bud initiation and development.

<u>Low light intensity</u>	<u>Number of days to anthesis.</u>		
	<u>8-hour day</u>	<u>10-hour day</u>	<u>12-hour day</u>
Experiment 1	94	102	103
Experiment 2	103	101	98
Experiment 3	93	83	81
 <u>Normal light intensity</u>			
Experiment 1	81	84	86
Experiment 2	87	84	85
Experiment 3	77	71	80

Note:

Experiment 1: Delaware variety lasting from June 16
to September 26.

Experiment 2: Delaware variety lasting from July 18
to November 8.

Experiment 3: Bon Deluxe variety lasting from Septem-
ber 12 to December 19.



Part 2. Effects of plant ages at the start of the short-day treatment on growth and flowering.

Experiment 4

Chrysanthemum morifolium var. *Americana* were used in this study. Cuttings were made on June 3, 1966; rooted cuttings were planted (1 plant per pot in 24 pots) on June 21, and pinched (3 stems per plant) a week later (June 27). Then, in order to keep the plants in a vegetative condition, natural day lengths were used (long day, 15½-hour day). To reduce the photoperiod, Silver Polito was put on at 5 p.m. and taken off at 9 a.m. the following morning, giving a total light exposure of 8 hours, that is the short day treatment, until harvesting. To find out whether or not the age of the plants influences flower bud initiation, its development and quality of potted chrysanthemums, six sets of 4 pots each were given the following treatments:

1. The first set received the short day treatments starting on June 27, at the time pinching was made.
2. The second set received the short day treatments starting on July 4, a week after pinching was made.
3. The third set received the short day treatments starting on July 11, 2 weeks after pinching was made.
4. The fourth set received the short day treatments

starting on July 18, 3 weeks after pinching was made.

5. The fifth set received the short day treatments starting on July 25, 4 weeks after pinching was made.

6. The sixth set received the short day treatments starting on August 1, 5 weeks after pinching was made.

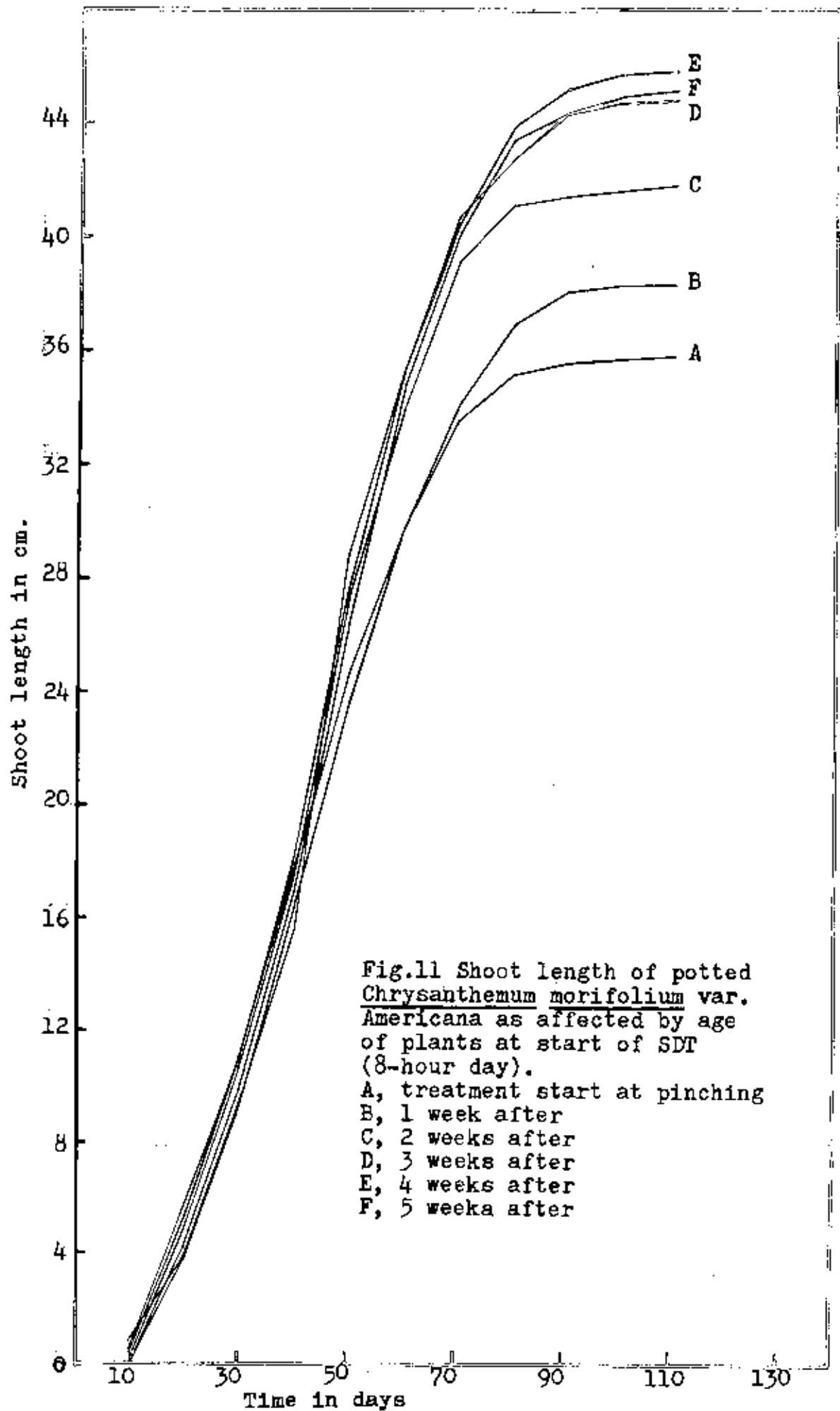
Table 4. Effects of plant ages at the start of the SDT on growth and flowering of potted Chrysanthemum morifolium var. Americana, experiment 4.

Treatment	Ave. shoot length (cm.)		Ave. nb. of stages of flowering		Ave. dia. of flower buds visible		Ave. no. of ray fls.		Ave. no. of disc fls.		% of Ave. ray no. of fls. lvs.		
	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	
1) Start SDT at the time pinching, June 27	35.8	35.8	A. 73	B. 73	A. 86	B. 86	A. 94	B. 94	10.5	238	6	97.5	21
			(Sept. 8)(Sept. 21)(Sept. 21)(Sept. 29)										
2) Start SDT 1 week after pinching, July 4	38.3	38.3	A. 77	B. 70	A. 91	B. 84	A. 98	B. 91	11.3	264	9	96.7	22
			(Sept. 12)(Sept. 26)(Oct. 3)										
3) Start SDT 2 weeks after pinching, July 11,	41.8	41.8	A. 75	B. 61	A. 86	B. 72	A. 93	B. 79	10.8	245	39	86.3	23
			(Sept. 10)(Sept. 21)(Sept. 28)										
4) Start SDT 3 weeks after pinching, July 18.	44.8	44.8	A. 78	B. 57	A. 87	B. 66	A. 96	B. 75	11.7	180	91	66.4	26
			(Sept. 13)(Sept. 22)(Oct. 1)										
5) Start SDT 4 weeks after pinching, July 25	45.8	45.8	A. 85	B. 57	A. 92	B. 64	A. 98	B. 70	12.0	201	41	83.1	27
			(Sept. 20)(Sept. 27)(Oct. 3)										
6) Start SDT 5 weeks after pinching, August 1	45.1	45.1	A. 87	B. 52	A. 93	B. 58	A. 100	B. 65	12.2	295	23	92.8	31
			(Sept. 22)(Sept. 28)(Oct. 5)										
A - After the time of pinching, B - After the start of SDT (8-hour day)													



Plate 4. Growth and flowering of potted Chrysanthemum morifolium var. Americana as affected by age of plants at start of SDT (8-hour day). From left to right: SDT started at pinching, 1 week, 2, 3, 4 and 5 weeks after pinching respectively.

(Photographed on October 5, 1966)



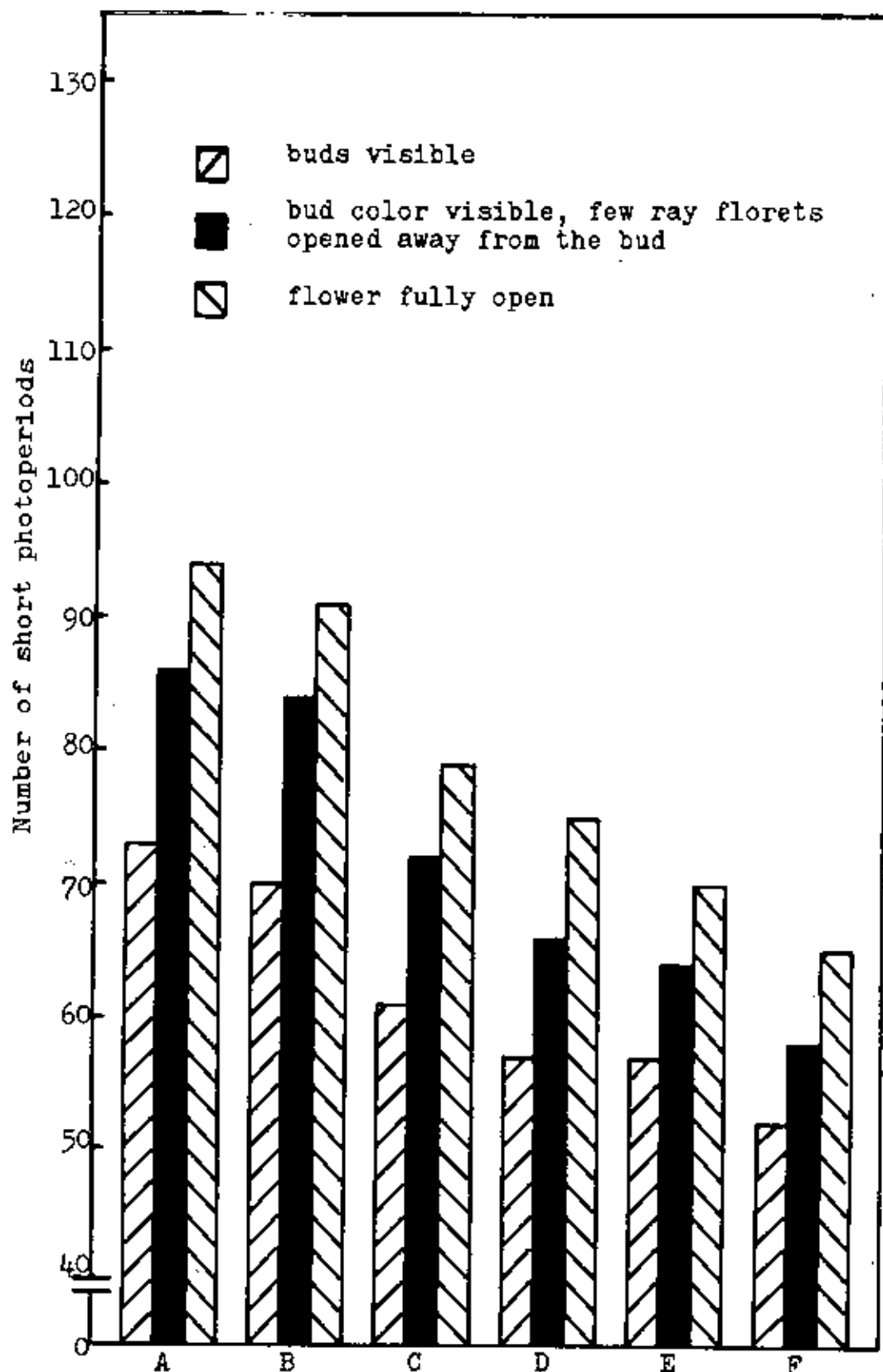


Fig.12 Flowering of potted *Chrysanthemum morifolium* var. *Americana* as affected by age of plants at start of short day treatments (8-hour day). A, treatments started at pinching; B, C, D, E, F, treatments started 1, 2, 3, 4 and 5 weeks, respectively, after pinching.

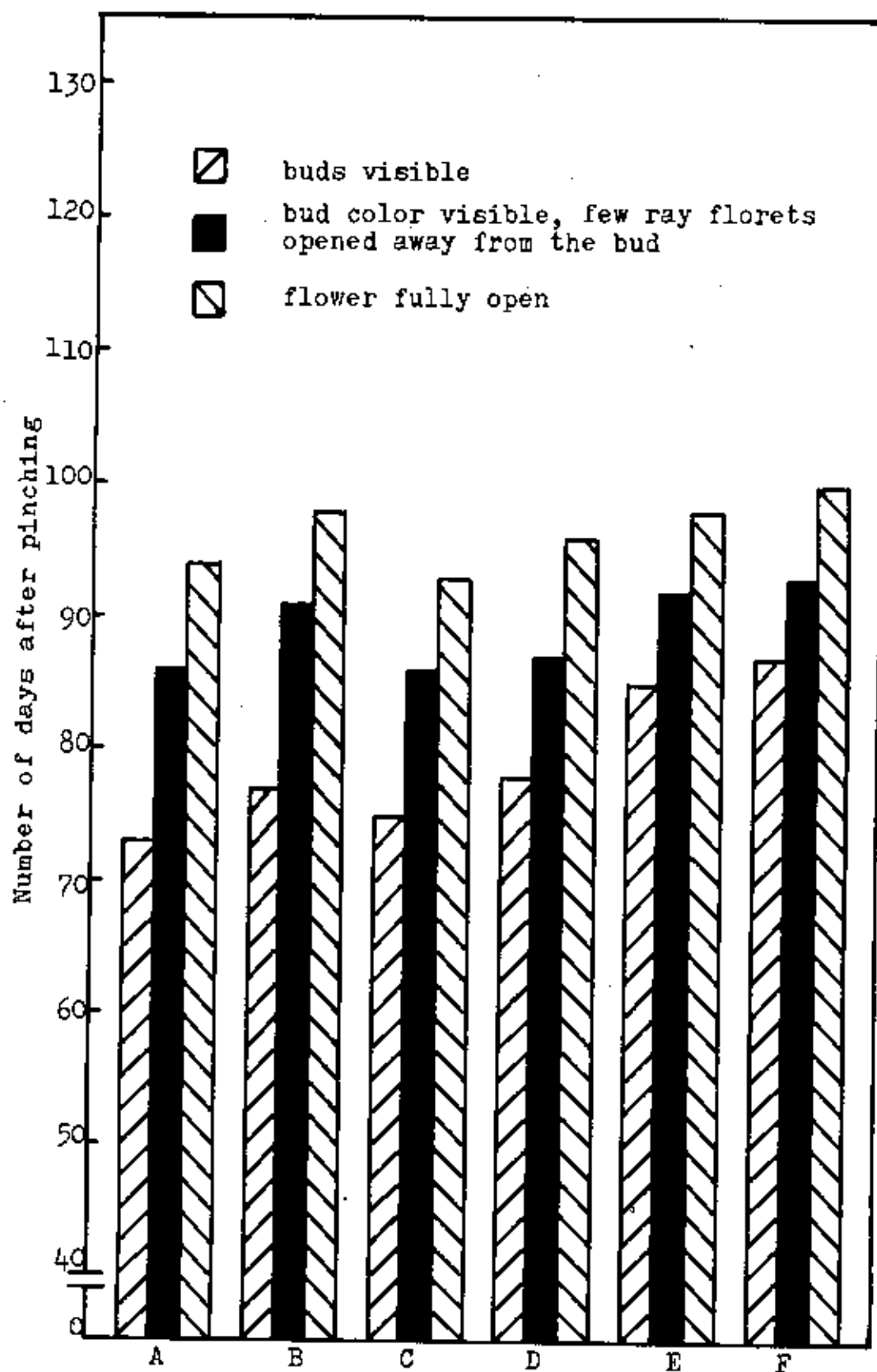


Fig.13 Flowering of potted *Chrysanthemum morifolium* var. *Americana* as affected by age of plants at start of short day treatments (8-hour day). A, treatments started at pinching; B, C, D, E, F, treatments started 1, 2, 3, 4 and 5 weeks, respectively, after pinching.

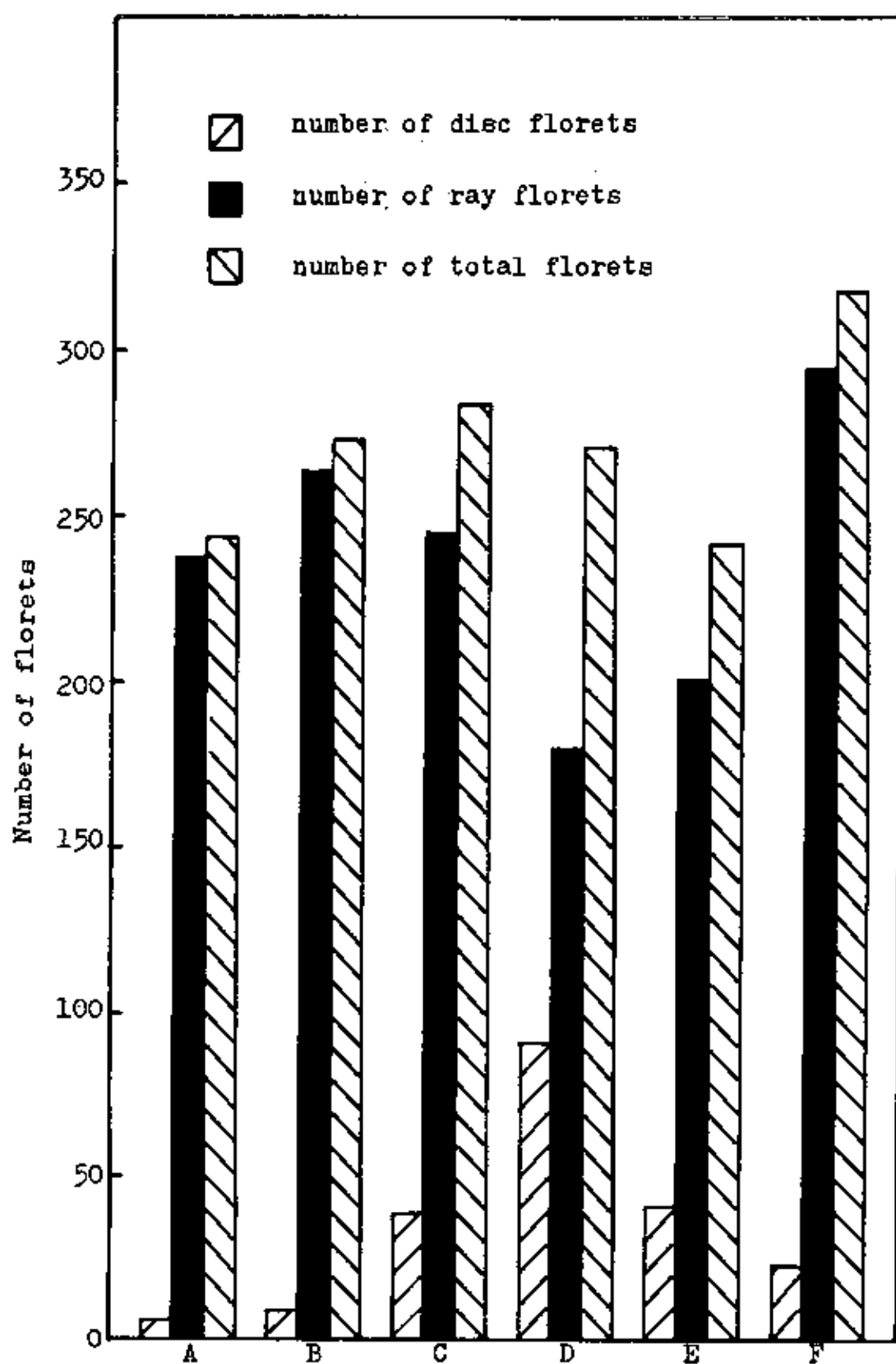


Fig.14 Number of florets of potted *Chrysanthemum morifolium* var. Americana as affected by age of plants at start of short day treatments (8-hour day). A, treatments started at pinching; B, C, D, E, F, treatments started 1, 2, 3 4 and 5 weeks, respectively, after pinching.

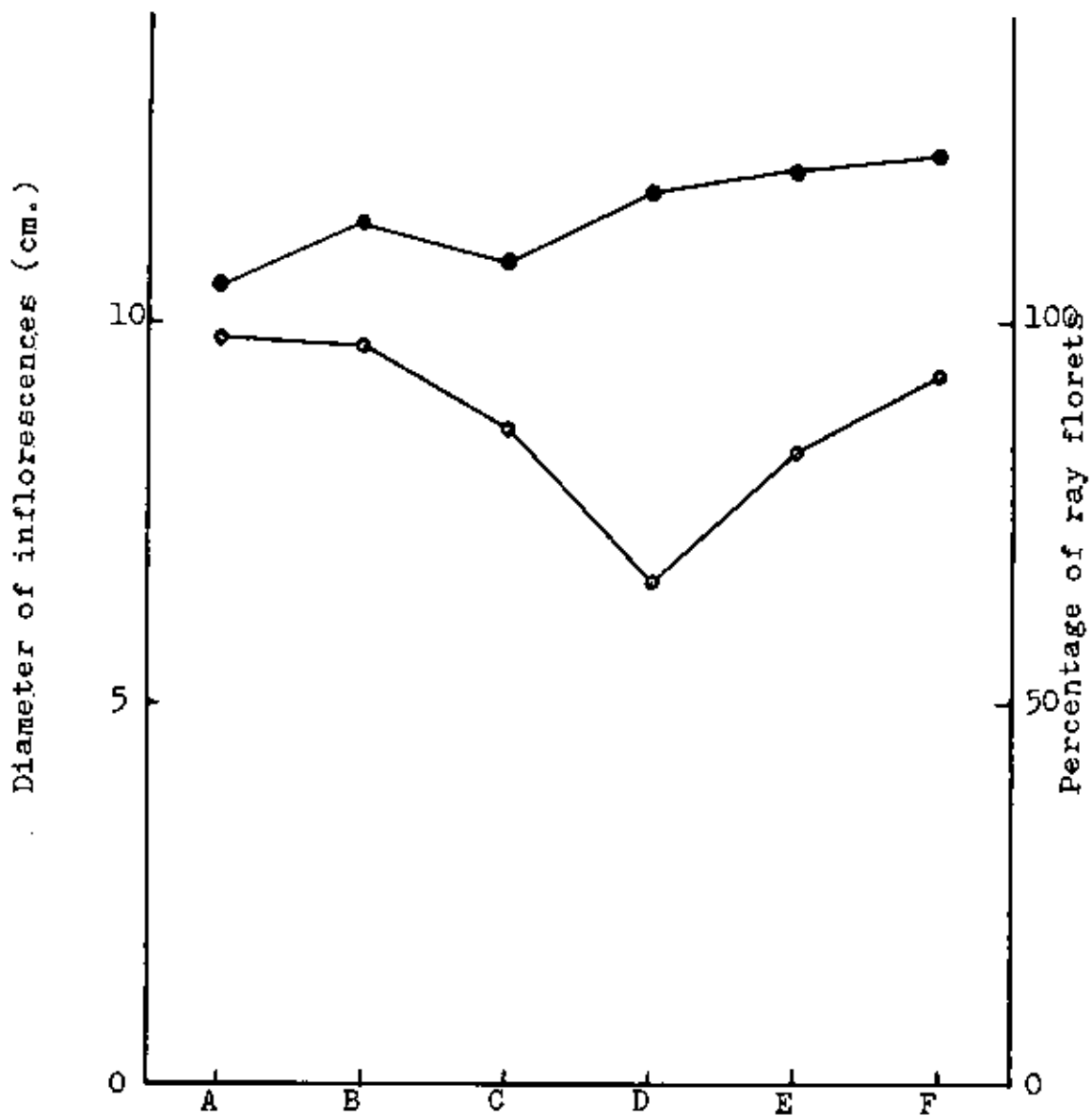


Fig.15 Flower quality of potted *Chrysanthemum morifolium* var. Americana as affected by age of the plants at start of short day treatments (8-hour day). A, treatments started at pinching; B, C, D, E, F, treatments started 1, 2, 3, 4 and 5 weeks, respectively, after pinching.

●—● diameter of inflorescences
○—○ percentage of ray florets

Summaries of results of experiment 4, the effects of plant ages at the start of SDT on growth and flowering.

1. Shoot lengths increased as ages advanced (Fig.11).
2. The number of short photoperiods required for flowering decreased as the age advanced (Fig.12).
3. There was little difference in the number of days after pinching until flowering in all treatments (Fig.13).
4. The diameter of inflorescences increased as the age advanced (Fig.15).
5. Although the percentage of ray florets decreased from 0 to 3 weeks after pinching at the time of starting SDT, the lowest percentage being at 3 weeks after pinching, an increase was observed after this (i.e. 4 weeks and 5 weeks). The decrease did not reach the highest levels in the cases of 0 week and 1 week (Fig.15).
6. Highest flower qualities are observed when SDT is started 5 weeks after pinching (Fig.15).
7. The number of leaves increased as the age advanced (Table 4).

Part 3. The effects of varying photoperiods.

Experiment 5

Chrysanthemum morifolium var. Bon Deluxe were used in experiment 5, in which cuttings were made on July 13, 1966; rooted cuttings were planted on August 8, and pinched on August 22. Then, in order to keep the plants in a vegetative condition, natural day length (14-hour long) plus supplementary illumination (A.L.) from incandescent lamp were used all night until September 5. Experiment 5 was started on September 5, and harvested on November 28; five pots of three plants per pot were used from each of the following five treatments:

1. The plants received the day length of 8 hours for 5 weeks from September 5 until October 10, and then were removed from the vinyl house to natural conditions with a natural day lengths varying from 12.15 to 10.45 hours for 7 weeks until November 28.

2. 8-hour days for 12 weeks from September 5 until November 28.

3. 8+2 A.L.-hour days for 5 weeks from September 5 until October 10, and then removed from the vinyl house to natural conditions with a natural day lengths varying from 12.15 to 10.45 hours for 7 weeks until November 28.

4. 8+2 A.L.- hour days for 12 weeks from September 5

until November 28.

5. 8+4 A.L.-hour days for 12 weeks from September 5 until November 28.

Note: Another series of 5 pots for 8+4 A.L.-hour days for 5 weeks followed by natural day lengths was begun, but due to root rot occurring in 3 pots, this series was abandoned.

Table 5. The effects of varying photoperiods on growth and flowering of potted Chrysanthemum morifolium var. Bon Deluxe, experiment 5.

Treatment	Ave. shoot length (cm.)	Ave. no. of stages of flowering	Ave. dia. of flower	Ave. no. of ray fls.	Ave. % of Ave. no. of disc fls.	Ave. no. of ray fls.	Ave. % of Ave. no. of lvs.
	Flower buds visible	Color visible	Flower fully opened	Fl. (cm.)	fls.	fls.	fls.
1) 8-hour day - natural day length	26.3 (Oct.1)	26 (Oct.1)	66 (Nov.10)	74 (Nov.18)	9.4	285	6 97.9 16
2) 8-hour day - 8-hour day	25.9 (Oct.1)	26 (Oct.1)	65 (Nov.9)	75 (Nov.19)	9.8	262	8 97.0 16
3) 8+2 A.L.-hour day - natural day length	31.8 (Oct.1)	26 (Oct.1)	67 (Nov.11)	75 (Nov.19)	9.3	291	5 98.3 17
4) 8+2 A.L.-hour day - 8+2 A.L.-hour day	33.8 (Oct.1)	26 (Oct.1)	65 (Nov.9)	75 (Nov.19)	10.0	288	7 97.6 17
5) 8+4 A.L.-hour day - 8+4 A.L.-hour day	36.2 (Oct.2)	27 (Oct.2)	68 (Nov.12)	78 (Nov.22)	9.8	299	9 97.1 16



Plate 5. Growth and flowering of potted Chrysanthemum morifolium var. Bon Deluxe as affected by varying photoperiods. From left to right: 8-N, 8-8, 8+2 A.L.-N, 8+2 A.L.- 8+2 A.L., 8+4 A.L.- 8+4 A.L.

(Photographed on November 10, 1966)

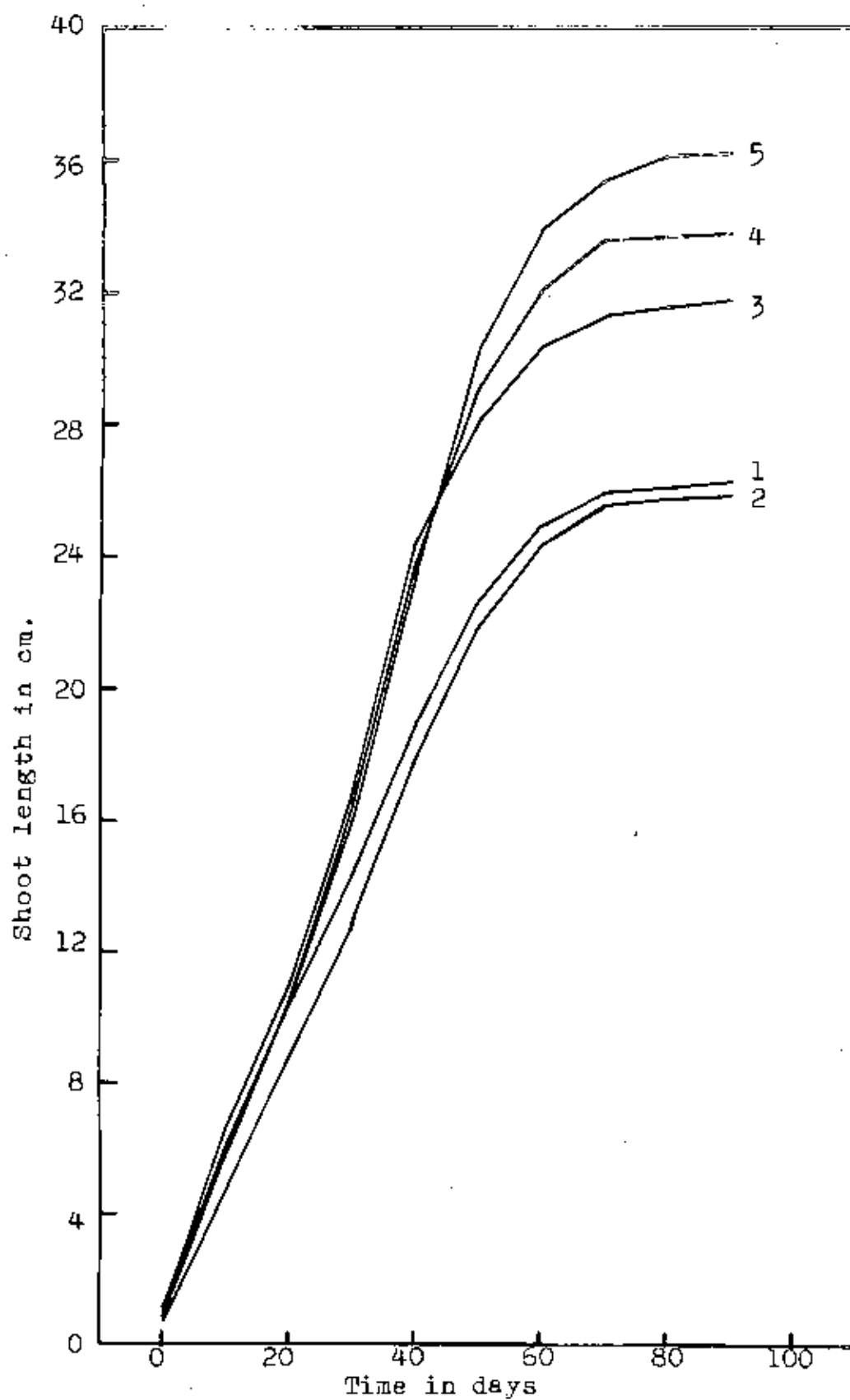


Fig.16 Shoot length of potted *Chrysanthemum morifolium* var. Bon Meluxe as affected by varying photoperiods:
 1. 8-N, 2. 8-8, 3. 8+2 A.L.-N, 4. 8+2 A.L.-8+2 A.L., 5. 8+4 A.L. - 8+4 A.L.

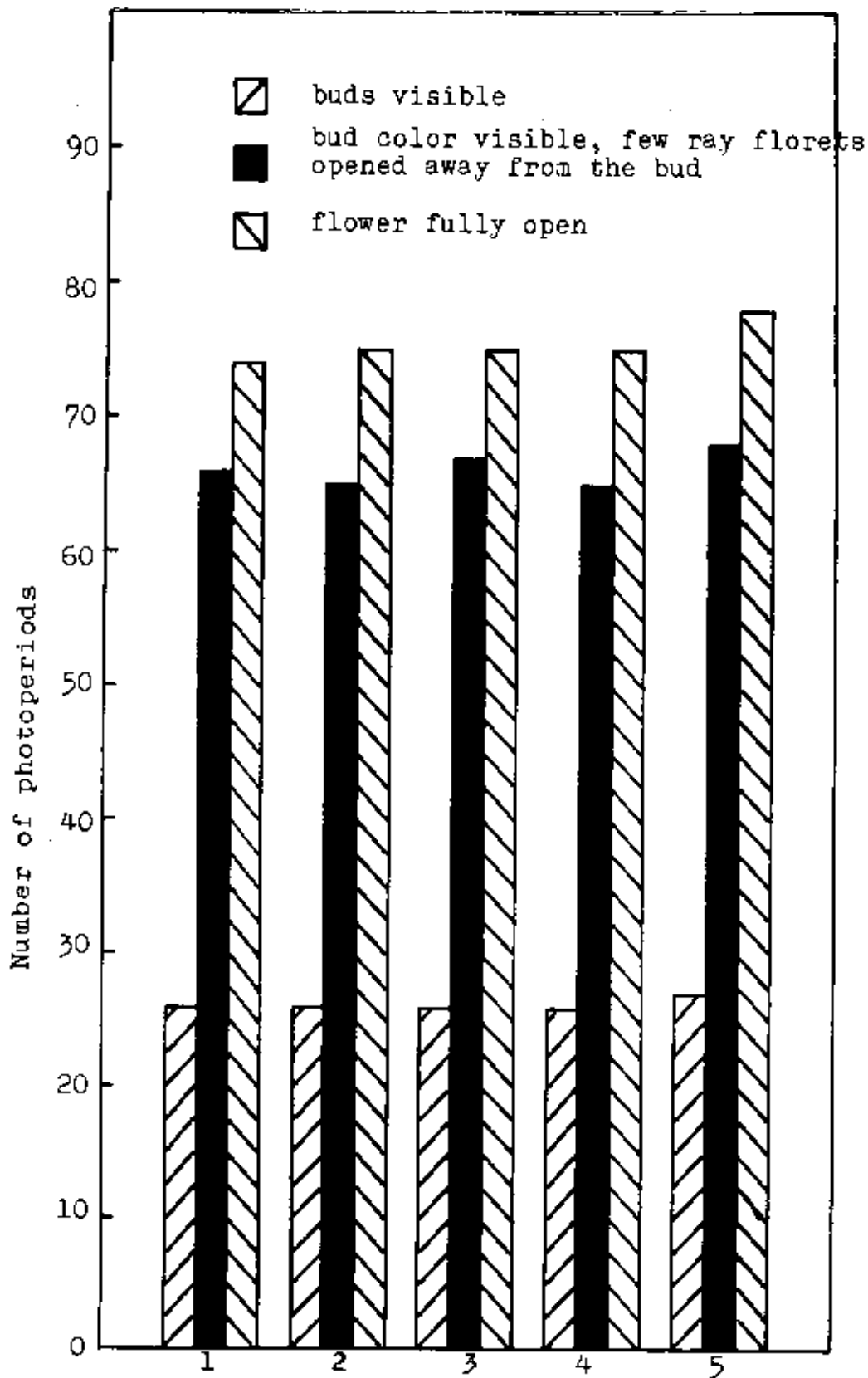


Fig.17 Flowering of potted *Chrysanthemum morifolium* var. Bon Deluxe as affected by varying photoperiods: 1. 8-N, 2. 8-8, 3. 8+2 A.L.-N, 4. 8+2 A.L.-8+2 A.L., 5. 8+4 A.L.-8+4 A.L.

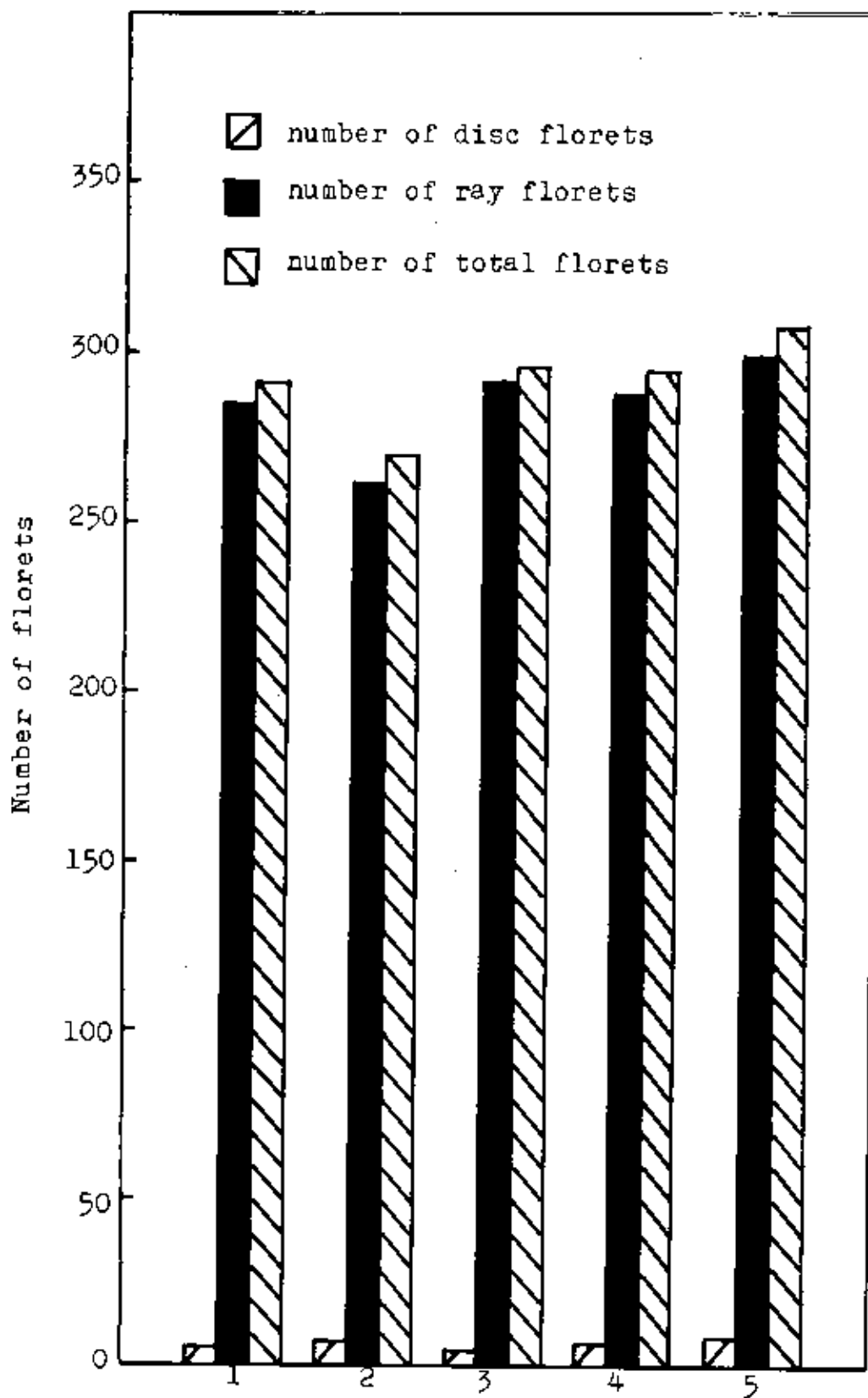


Fig.18 Number of florets of potted *Chrysanthemum morifolium* var. Bon Deluxe as affected by varying photoperiods: 1. 8-N, 2. 8-8, 3. 8+2 A.L.-N, 4. 8+2 A.L.-8+2 A.E., 5. 8+4 A.L.-8+4 A.L.

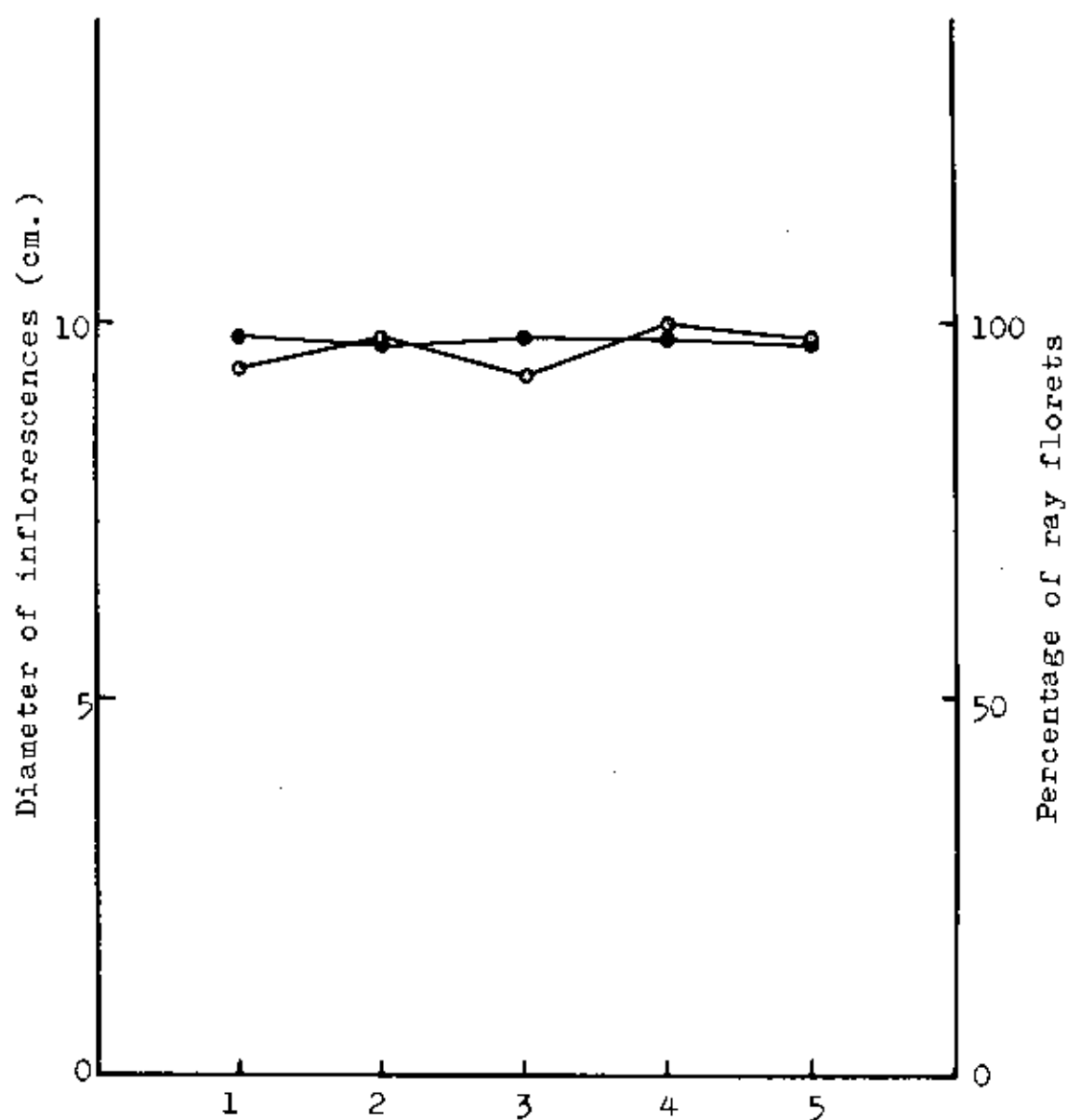


Fig.19 Flower quality of potted Chrysanthemum morifolium var. Bon D_eluxe as affected by varying photoperiods:
 1. 8-N, 2. 8-8, 3. 8+2 A.L.-N, 4. 8+2 A.L.- 8+2 A.L.,
 5. 8+4 A.L.- 8+4 A.L.

—●— diameter of inflorescences
 —○— percentage of ray florets



Summaries of results of experiment 5, the effects of varying photoperiods.

1. Plants treated with 8-hour day-length have a shorter shoot length than those treated with 10-hour, or treated 12-hour (Fig.16).
2. Little difference in photoperiods is required for flowering in all cases (Fig.17).
3. The flower diameter of plants subjected to alternate photoperiod treatments was smaller than that of plants subjected to continuous short-day treatments (Fig.19).
4. There are little differences in flower quality among treatments but that in 10-10 was the best under testing conditions (Fig.19).
5. Little differences in leaf numbers among treatments were recognized in all cases (Table 5).

Part 4. Flowering of newly bred varieties during different seasons.

Experiment 6

In order to suggest the optimal planting time for 54 newly bred varieties, (which were selected in previous year in the Department of Agronomy, Faculty of Agriculture, Kyoto University, Japan) about 5 pots of each variety, 1 plant per pot were used in this experiment. The cuttings were subjected to short day (8 hours) treatments during four different seasons as follows:

	Exp.1	Exp.2	Exp.3	Exp.4
Cutting date	May 2	June 8	Aug.1	Aug.10
Planting date	May 25	June 27	Aug. 23	Sept. 6
Pinching date	June 1	July 4	Aug. 31	Sept.16
SDT starting date	June 15	Aug. 20	Sept.30	Oct. 23

Table 6. Number of short photoperiods from start of SDT until flowering in the 54 varieties.

No.	Cross Combination	Number of short photoperiods (day).			
		Exp.1	Exp.2	Exp.3	Exp.4
1	Red Star Delaware	70	69	65	69
2	Pinocchio Yellow Chip	80	81	76	71
3	Red Star Delaware	65	71	66	67
4	Red Star Delaware	60	-	70	73
5	Red Star Delaware	72	75	61	-
6	Red Star Delaware	61	76	67	-
7	Red Star Delaware	89	73	61	-
8	Red Star Delaware	80	-	67	-
9	Pinocchio Yellow Chip	70	80	64	-
10	Red Star Delaware	69	80	73	80
11	Red Star Delaware	85	76	71	74
12	Red Star Delaware	84	79	71	72
13	Red Star Delaware	70	82	70	67
14	Red Star Delaware	69	82	-	72
15	Mrs. Roy Delaware	70	-	66	-
16	Pinocchio Rose Chip	77	86	71	66
17	Pinocchio Yellow Chip	82	-	76	73
18	Pinocchio Rose Chip	82	77	73	71
19	Pinocchio Blazing Gold	81	82	81	-
20	Jetfire Golden Herald	78	73	76	-
21	Jetfire Delaware	86	80	61	73
22	Pinocchio Yellow Chip	70	84	68	-
23	Jetfire Delaware	65	77	73	73
24	Red Star Aztec	62	77	69	67
25	Pinocchio Yellow Chip	52	64	61	66
26	Pinocchio Yellow Chip	59	72	77	*
27	Jetfire Delaware	59	92	89	*

Table 6. (cont.) Number of short photoperiods from the start of SDI until flowering in the 54 varieties.

No.	Cross combination		Number of short photoperiods (day)			
			Exp.1	Exp.2	Exp.3	Exp.4
28	Pinocchio	Rose Chip	56	68	67	63
29	Jetfire	Delaware	65	71	74	77
30	Copperhead	Golden Herald	72	76	88	-
31	Red Star	Delaware	65	87	71	79
32	Red Star	Aztec	54	87	72	72
33	Pinocchio	Yellow Chip	57	82	62	66
34	Miss Hiroshima	Blue Chip	59	60	62	*
35	Pinocchio	Gold Coast	56	66	63	76
36	Pinocchio	Yellow Chip	65	73	67	68
37	Copperhead	Aztec	65	76	75	73
38	Pinocchio	Yellow Chip	62	69	65	68
39	Copperhead	Golden Herald	65	72	74	76
40	Pinocchio	Rose Chip	52	64	64	71
41	Pinocchio	Yellow Chip	56	66	62	66
42	Jetfire	Aztec	64	87	63	66
43	Jetfire	Aztec	78	77	66	65
44	Red Star	Aztec	66	76	64	64
45	Jetfire	Golden Herald	68	77	88	78
46	Jetfire	Golden Herald	65	68	91	76
47	Pinocchio	Yellow Chip	52	69	62	67
48	Red Star	Aztec	54	77	73	63
49	Pinocchio	Yellow Chip	56	64	61	66
50	Miss Hiroshima	Blue Chip	52	62	63	71
51	Miss Hiroshima	Blue Chip	57	71	80	76
52	Pinocchio	Rose Chip	53	65	63	71
53	Alaska	Rose Chip	58	73	77	66
54	Alaska	Rose Chip	72	70	62	63

* Rosette