LEAF HETEROMORPHISM AND PHOTOPERIODS IN *SESAMUM ORIENTALE* L.

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IN connexion with an investigation on the photoperiodic effect in *Sesamum orientale* L. (I.P. 7 and I.P. 29) in relation to the variations of the environmental factors of the four seasons: winter (sown on January 1), summer (sown on April 1), monsoon (sown on July 4) and autumn (sown on October 1), it was found that the leaf-forms in both the varieties were extremely variable. The lower leaves are generally ovate lanceolate, and with the onset of flower buds linear lanceolate leaves were produced in addition to a large number of leaves of different shapes with serration and various degrees of split margins depending upon the sowing time and different photoperiods. The variation of leaves was a prominent feature in plants growing in long photoperiods (14 hr.), but was not observed in plants growing in short photoperiods (10 hr.). The control plants of the monsoon sowing exposed to the long photoperiods of Nature (13 hr. 9 min. to 11 hr. 55 min.) also showed clear variations.

Records of leaf-forms were kept for all the plants of the different photoperiods of 10–16 hr. in the sowing of October 1. The leaves that were more than 4 cm. in length were all taken into account; the cotyledonary leaves were excluded. The counting was done on the 60th day after sowing. A record was also kept for the forms of leaves that died before that date. The readings were taken for each plant separately and the results presented as the mean of total number of plants (20 plants; 5 pots with 4

photoperiods will give an idea of the degree of variation due to different photoperiods. If this ratio between the serrate plus the different types of divided leaves to the total number of leaves

Leaves with non-entire margins

Leaves with non-entire margins + with entire margins

is described as the 'leaf heteromorphism index', the indices for the two types of *Sesamum* at the different photoperiods, together with the mean numbers of the different forms of leaves for the different treatments, are given in the accompanying table.

Light period	Linear lanceolate entire	Ovate lanceolate entire	Ovate lanceolate serrate	Ovate entire	Ovate serrate	Fid	Partite	Sect	Total	Leaf het. index
I.P. 29										
10 hr.	6.29	1.72		4.61					12.62	0.0
Control										
11 hr. 56 min. to										
10 hr. 51 min.	7.54	1.27		6.67					15.48	0.0
12 hr.	6.45	1.30	0.30	6.10	1.05				15.20	0.09
13 hr.	5.00	1.50	0.68	4.00	3.45	0.26	1.05	0.53	16.47	0.36
14 hr.	2.6	2.30	1.3	5.05	4.50	0.00	0.30	0.25	16.30	0.39
15 hr.	2.10	1.65	0.40	4.80	5.65	0.45	0.55	0.50	16.10	0.47
16 hr.	2.5	1.00	2.90	4.00	4.15	0.75	0.90	1.50	17.70	0.58
I.P. 7										
10 hr.	7.39	3.11		5.72					16.22	0.00
Control	7.35	2.25		6.25	0.17				16.02	0.00
12 hr.	7.05	3.10		6.30	0.20				16.65	0.00
13 hr.	5.30	2.77	0.15	5.08	2.31				15.61	0.20
14 hr.	3.44	2.88	0.25	5.56	3.38				15.51	0.23
15 hr.	4.45	2.00	0.40	5.90	3.90	0.10	0.25	0.05	17.05	0.26
16 hr.	4.19	3.00	0.38	6.25	4.56	0.19	0.88	0.38	19.83	0.32

plants each) in each treatment under the following forms of leaves: (a) linear lanceolate entire, (b) ovate lanceolate entire, (c) ovate lanceolate serrate, (d) ovate entire, (e) ovate serrate, (f) 'fid' where splitting of margin reached less than half the lamina, (g) 'partite' where splitting of margin reached half the breadth of the lamina, (h) 'sect' where splitting reached the petiole or the midrib, giving the appearance of trifoliate or very rarely pentafoliate compound leaves. Assuming that the entire leaves are normal in *Sesamum*, the proportion of serrate and divided leaves to the total number of leaves in different

The number of the different forms of leaves and leaf heteromorphism indices in the different light periods clearly shows that the proportion of serrate and divided leaves increases with increasing light periods in both the varieties and that for a particular light period the leaf heteromorphism is higher in I.P. 29 than in I.P. 7. In the other sowings also the plants receiving a 14-hr. light period produced larger and more variable leaf forms than the control, and heteromorphism of leaf was not evident in plants of short light period treatments (10 hr.) of all the sowings.