at the end of each day to 500-watt Mazda lights suspended about 24 inches above the plants. In each light and temperature test there were three plant groups, one group placed under the differential light treatments on September 1; a second group brought into the greenhouse and placed under the light treatments on November 15, after having been exposed to the normal temperatures and short days of fall (about 11 hours); and a third group brought into the greenhouse and placed under the light treatment on January 1, after having had a low-temperature rest period in an unheated house. Records were taken on March 2, after the September 1 lots had been in the greenhouse 6 months, the November 15 lots 3½ months, and the January 1 lots 2 months. Leaf areas for one plant each of Blakemore and Fairfax were averaged to indicate amount of growth attained under each treatment, as an examination of all plants of all varieties showed that these two varieties were representative except in the case of Missionary under short days. Table 1 gives the average leaf area for the plants of the two typical varieties under the different light and temperature conditions on March 2.

TABLE 1

EFFECT OF VARIOUS PHOTOPERIODS AND TEMPERATURES ON LEAF AREA OF STRAWBERRY PLANTS, BELTSVILLE, MD.

Date of starting experiment	Condition of plant at start of experiment	Average leaf area on March 2, 1936					
		Day length at 70° F.			Day length at 60° F.		
		16-hr. day	14-hr. day	Normal day	16-hr. day	14-hr. day	Normal day
		Sq. cm	Sq. cm	Sq. cm	Sq. cm	Sq. cm	Sq. cm
Sept. 1	Not resting ..	934	667	426	913	460	407
Nov. 15	Resting	1,023	991	508	531	200	274
Jan. 1	Rest broken	1,023	947	668	825	581	422

At 70° F. all varieties in all three groups developed approximately the same leaf area, both in the 16-hour- and the 14-hour-day tests (the September 1 14-hour-day plants being smaller but not significantly so). In the normal-day lot, however, the September 1 and November 15 groups were similar and were still in their rest period, while the January 1 group had developed a considerably larger leaf area, indicating that its rest period had been broken. Thus, a 70° F. exposure to photoperiods of 16 and 14 hours (1) prevented a rest period in the September 1 group and (2) broke the rest period in the November 15 group. Previous exposure to low temperatures had already broken the rest period of the January 1 group.

At 60° F. the 14-hour- and normal-day lots of the September 1 group were still in their rest period, while the 16-hour lot was growing vigorously. None of the November 15 group grew vigorously at 60° F., although the 16-hour lot made some growth. Plants in the 14-hour- and normal-day lots of the November 15 group even decreased in size from loss of leaves. Each lot of the January 1 group made good growth (the normal-day plants after two months actually being as large as the September 1 normal-day lot) after six months in the greenhouse. Thus, at 60° F. under 16-hour days, (1) plants that were not in the resting condition at the start of the experiment (*i.e.*, the September 1 lot) did not undergo a rest period; and (2) plants that were in the resting condition at the start (*i.e.*, the November 15 lot) had their rest period partially broken at 60° F. under 14-hour days; (3) plants not in the resting condition (*i.e.*, September 1 lot) went into a rest period; and (4) plants in the resting condition (*i.e.*, November 15 lot) did not have their rest period broken.

The strawberry differs from many plants in that it retains its green leaves while in the resting condition. Most fruit plants lose their leaves when entering the rest period, and as a result light has no effect on the rest period. In southern states, when there is not sufficient low temperature in winter to break the rest period of fruits such as the peach, the leaves appear slowly, and after many weeks the rest period is broken and active growth is resumed. In contrast, in this experiment the strawberry plant had green leaves through which light could have an effect, and long days at high temperatures were fully effective in breaking the rest period.

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