that at lower temperature. Treatment at 40° C for 2, 4 and 6 hrs also resulted in increased size of heads.

Depression on the florets was the chief symptom of the virus under investigation. Treatment of plants at 35° C for different periods (2, 4, 6 and 8 hrs) showed a decrease in the number of depressions per floret. Plants treated at 40 C for 2 hrs produced an average of only one depression per floret. Exposure above 40° C for 2 hrs caused some decrease in the number of depressions per floret but none of the treatments was as effective as that at 40° C for 2 hrs (Fig. 1).

FIG. 1. *Left* — Untreated infected *Chrysanthemum* plant. *Right* — Treated infected *Chrysanthemum* plants.

Heat treatment at 40° C for 2 hrs was found to be the best; as it reduced the number of depressions per floret and time of flowering and improved the size of flowers but could not free the plants totally from CAV infection. It is proposed to couple the meristem tip culture along with heat treatment to have virus-free propagules.

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EFFECT OF 2, 4-D ON SEED GERMINATION, HYPOCOTYL ELONGATION AND AMYLASE ACTIVITY IN *PHASEOLUS RADIATUS*

THE use of 2, 4-Dichlorophenoxy acetic acid (2, 4-D) to promote[1] or inhibit[2,3] seed germination is known for some time. The present investigation deals with the effect of 2, 4-D on germination, hypocotyl and radicle elongation and amylase activity of the seedlings of *P. radiatus*.

Seeds of *P. radiatus* obtained from NSC were soaked for 24 hours in aqueous solutions of 2, 4-D in the range of 0–1000 ppm in triplicate. Germination percentage, hypocotyl and radicle elongation (mm)[3] and amylase activity[4] were studied in two days old seedlings at pH 5·6 and temperature 31 ± 1·5° C.

The average seed germination of *P. radiatus* was 100% in 0, 1 and 10 ppm, 50% in 500 ppm and 16·6% in 1000 ppm of 2, 4-D proving that the auxin herbicides inhibited seed germination[5]. Further, the average hypocotyl length was reduced by 2·5 times (9·6 mm) in 1 ppm, 5 times (4·9 mm) in 10 ppm and almost 50 times (0·5 mm) in 1000 as compared to control (23·7 mm). The inhibitory effect was observed even at 1 ppm on the radicle growth. An enormous fall in the amylase activity (30%) was observed at 1 ppm as compared to control and the average amount of starch reacted varied inversely with the amount of 2, 4-D added. The variation in reaction times followed a zero order kinetics from 1 to 200 ppm and fractional order (0·3) from 500 to 1000 ppm of 2, 4-D. Amylase activity seemed to be modified due to additional molecules of 2, 4-D adsorbed to the protein surface with consequent loss of its catalytic activity[6].

It was thus concluded that 2, 4-D inhibited hypocotyl and radicle elongation which appeared to be coupled with enzyme activity during germination of *P. radiatus*.

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INFLUENCE OF DIFFERENT PHOTOPERIODS ON THE FLOWERING OF MUNGBEAN

EARLIER studies have shown that mungbean (*Vigna radiata* L.) is a short day plant and its flowering time is influenced by photoperiod and temperature[1-4].

The purpose of the present study was to investigate the range of variability in photoperiodic response in different cultivars of mungbean. It was considered that such an information would help in making a future programme for classifying the existing genotypes into response groups for the benefit of agronomists and plant breeders.

Four mungbean cultivars, namely Pusa-Baisakhi, S-8, PS-10 and PS-16 were selected for this study. The plants were raised in earthen pots of 12" diameter under three photoperiodic conditions, *i.e.*, short day (8 hours day), natural day (day length prevailing between July and September in Delhi) and long day (24 hours day). Plants were kept under these conditions from germination to maturity. For each treatment 20 replications were maintained. The method for exposing the plants to different photoperiod treatments is described elsewhere[5]. The experiment was repeated in three seasons consecutively: July-September 1974, 1975 and 1976. The data for 1976 were statistically analysed and critical differences are shown in Fig. 1.

The initial flowering (periods in days from sowing to initiation of flowering) for all the four different cultivars is shown in Fig. 1. When plants were exposed to 8 hour photoperiod or to normal day conditions, the variation did not show significant differences in their flowering. When the plants were exposed to continuous light, remarkable differences were however noted in the flowering time of the four cultivars. S-8 failed to flower and PS-10 showed delayed flowering (52 days). The other two cultivars also flowered late but the effect was not significant.

On the basis of these results the four cultivars can be classified into different response groups, *i.e.*,

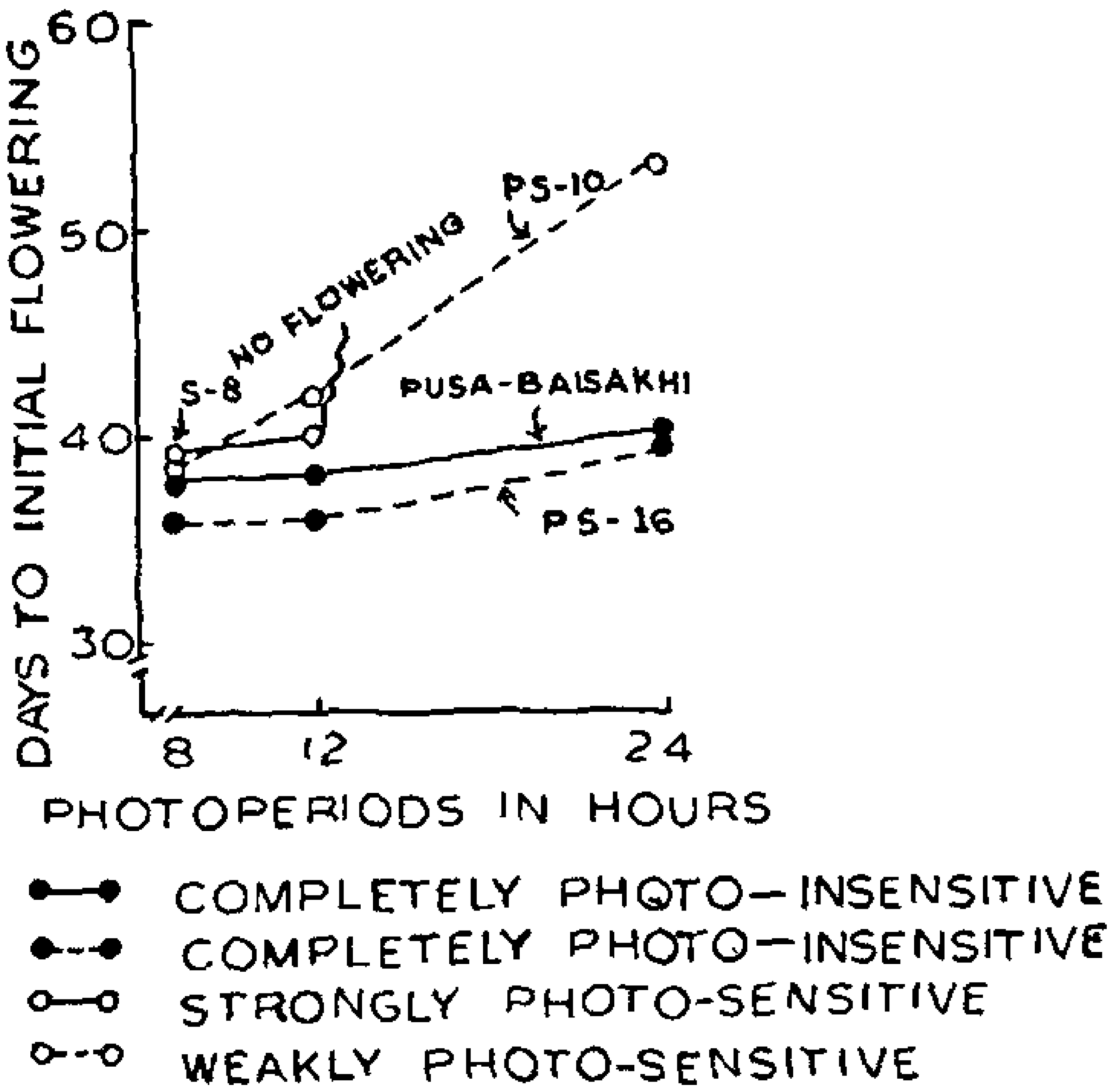

FIG. 1. *Effect of three photoperiod treatments on* the flowering period of four mungbean cultivars. Abscissa shows periods in days taken for initial flowering. Ordinate denotes 8, 12 and 24 hours photoperiods.

Critical difference at 5% P; Photoperiods — N.S.; Varieties — N.S.; Photo × Var = 4·02.

(1) strongly sensitive (S-8), (2) weakly sensitive (PS-10) and (3) completely insensitive (Pusa-Baisakhi and PS-16). This grouping may be more meaningful if a large number of genotypes are screened for their photoperiodic response and divided into such categories.

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OCCURRENCE OF *LEVEILLULA TAURICA* ON *CARICA PAPAYA* IN INDIA

DURING the months of February and March 1978 some of the papaya plants of the variety Washington growing at the Experimental Farm at Hessaraghatta were severely infected by powdery mildew. On close examination it was observed that the symptoms