of flowering was 4-15 days in some of the pear varieties.

The percentage of fruit-set through self-pollination ranged between 0.00 to 38.54 being highest in AR-90-24. The AR-90-13, 15, 17, 18, 19 and 30 did not set any fruit. This indicates that these strains/cultivars may be self-incompatible and need pollinizer for satisfactory fruit set. However, this needs further investigation. The coefficient of variation for fruit set was as high as 193.86 which shows that some of the strains/cultivars which have high fruit set on selfing could be the potential genotypes for obtaining higher yield. Earlier, Mukherjee and Rana (1966) reported 18.6, 13.8 and 5.9% natural fruit set in LeConte, Kieffer and Smith cultivars, respectively under sub-tropical conditions.

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Screening Soybean (*Glycine max* (L) Merr.) Germplasm for Spring Summer Cultivation

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Soybean as a spring-summer crop has a great potential in India. It can serve two vital purposes. It can provide sustainability to rice-wheat cropping system, which is followed in an area of around 9 million ha and is facing problem of declining factor productivity due to its high energy demand, nutrient deficiencies, build-up of pests and deterioration in physical conditions of soil. Secondly, it can bring additional area under soybean cultivation to narrow down the current gap of 8 million tonnes that exists between the production of soybean in the country and the installed processing capacity of the soybean oil processing industry (Lal, 2001). As soybean is a short-day plant (Meyer *et al.* 1973), a different plant type is required for spring-summer crop. The present varieties under cultivation are too late in maturity and may not be suited for long day and short-duration of spring-summer crop. Genotypes less sensitive to photoperiod and early in maturity are required for this purpose. Therefore, an experiment was undertaken to screen lines from the working germplasm collections available with the project.

Early maturing lines are generally less sensitive to photoperiod (Shanmugasundaram, 1981). Therefore, out of 600 lines working collections, 20 lines of *G. Max* (L) Merr. maturing in less than 100 days during *Kharif* season and one line of *G. sojae* were selected for planting during spring-summer 2000. The genotype were planted in a RBD with three replications, with a plot size of 2 rows of 5m length.

Days to 50% flowering of these lines were observed during *Kharif* 1999 and spring-summer 2000 (Table 1). Delay in days to 50% flowering ranging from 6 to 23 days was observed during spring-summer season as compared to *Kharif* season. Flowers were not developed on *G. sojae*. Out of 21 lines studied, pod formation was observed only in four lines. But seed filling was very poor in all the four lines.

Floral induction in early maturing varieties are less influenced by photoperiod than in the late maturing varieties (Yoshida, 1952). Since early maturing lines are less sensitive to photoperiod, out of working collection of six-hundred germplasm lines, 21 lines maturing in less than 100 days during *Kharif* season were selected for this study. The delay in flowering during spring-summer season was due to sensitivity of the genotypes to the long day conditions. The cumulative photoperiod observed during *Kharif* 99 and spring summer 2001 is shown in Fig. 1. This finding is consistent with the

Table 1. Days to 50% flowering in *Glycine max* and *G. sojae*

Acc. No.	*Kharif* 1999 Photo-period	*Kharif* 1999 Days to 50% flowering	Summer 2000 Photo-period	Summer 2000 Days to 50% flowering
1	192	34	332	40
2	187.4	33	332	40
3	201.3	35	368.6	45
4	187.4	33	332	40
5	201.3	35	368.6	45
6	216.1	38	370.3	46
7	231.6	44	409.1	53
8	228.4	40	387.6	48
9	229	41	436.9	57
10	216.1	38	379	47
11	192	34	368.6	45
12	216.1	38	368.6	45
13	231.6	44	409.1	53
14	207.7	36	379	47
15	207.7	36	409.1	53
16	222.7	39	387.6	48
17	229	41	402.3	51
18	216.1	38	402.3	50
19	211.2	37	370.3	46
20	229	41	402.5	52
21	229	41	421.8	55

earlier studies (Hadley *et al.* 1984; Summerfield *et al.* 1993). The variability in duration of delay in days to flowering can be explained on the basis of variation in the genes which control time to flowering. Five loci have been reported to control time to flowering and maturity in soybean (Cober *et al.* 1996). A delay in flowering ranging from 1 to 23 days depending upon the type of gene present has been reported (Bernard, 1971; Buzzell, 1971; Buzzell and Bernard, 1975; McBlain *et al.* 1987). Pod formation was observed in less sensitive lines. However, seed filling was delayed due to abnormally high temperature and dry soil conditions at the time of pod formation. Increase in day length results in slow seed growth rate. Prolonged drought stress during seed filling decreases nitrogen fixation resulting in poor seed filling.

None of the lines screened were found suitable for cultivation during spring-summer season. However, four lines in which pod formation was observed, which can be utilized in the crossing programme.

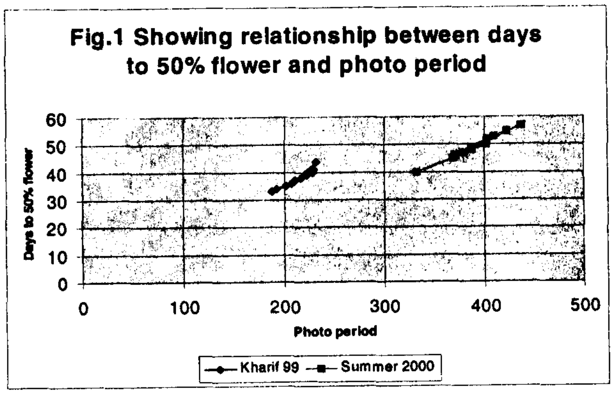

Fig. 1. Relationship between days to 50% flower and photoperiod

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