

Effect of Phosphorus and Growth Regulators on Flower Shedding of Cowpea *

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Field experiments were conducted to study the effect of phosphorus and growth regulators, viz., Planofix (NAA) and ethrel on flower shedding in PLS 370 cowpea. The result showed that application of 25 kg P₂O₅ / ha, Planofix at 40 ppm and ethrel at 100 and 150 ppm significantly reduced the percentage of flower shedding in cowpea in summer.

Problems of flower, bud and petal drop, distinct from problems of fruit set, exist in a number of crops. Flower shedding in plants is considered as physiological phenomenon controlled by environment, internal and genetic factors (Addicott, 1954). In cowpea, grain yield is limited by several factors including pest infestation and unfavourable environmental conditions (Ebong, 1968). Perhaps the single most limiting factor is the premature abscission of flowers and young pods which has been shown not to result from insect damage (Taylor, 1965), but due to physiological mechanism (Ojehomon, 1970). Kurdikeri *et al.* (1973) observed maximum flower shedding in control and the shedding was minimum due to application of P alone at 22kg P₂O₅/ha in cowpea. Similarly several studies have shown that foliar spray of planofix and ethrel has reduced the flower shedding of grain legumes. Application of 40 ppm planofix at the initial flowering in cowpea (CV. C.152) gave an additional yield of 179 kg/ha

(Anon., 1976). Application of ethrel at 100 ppm to redgram, 150 ppm to greengram and 250 ppm to blackgram increased the yield by 17, 19 and 57 per cent respectively (Anon., 1977).

MATERIAL AND METHODS

A field experiment was conducted in Tamil Nadu Agricultural University farm, Coimbatore, during summer and *kharif* seasons of 1978, to study the effect of phosphorus and foliar spray of planofix (NAA) and ethrel (2-chloro ethyl phosphonic acid) on cowpea (PLS 370) in split-plot design, replicated thrice. Five levels of P₂O₅ (0, 12.5, 25, 37.5 and 50kg/ha) were taken as main plot treatments and in sub-plots six treatments involving control, water spray, planofix at 20 ppm, and 40 ppm and ethrel at 100 and 150 ppm were taken. The soil is a deep and moderately drained clay loam, low in available N (268 kg/ha), medium in available P (16.2 kg/ha) and high in available K (683 kg/ha).

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Foliar spray of planofix and ethrel was done twice, using teepol as adhesive with a hand operated sprayer. The first spray was given at stray flowering when there was atleast one open flower in a plant and the second spray at the peak flowering.

To assess the flower shedding per plant, ten plants were chosen at random in each plot. After the first spray of growth regulators, number of fully

opened flowers was counted from the time of opening of the first formed flower. It was recorded daily till flowering was completed. The number of pods set per plant was recorded at harvest. The difference between the total number of flowers produced per plant and the total number of pods set per plant indicated the total number of flowers shed per plant for the whole flowering period. The flower shedding percentage was calculated as follows :

$$\text{Flower shedding percentage} = \frac{\text{Total Number of flowers shed per 10 plants}}{\text{Total number of flowers produced per 10 plants}} \times 100$$

Total flower production per plant

On an average about 59 ± 6 of total number of flowers in summer and 50 ± 10 in *kharif* were produced per plant in various treatments (Table). Phosphorus application slightly increased the number of flowers produced per plant, but the difference among P levels was not significant. This is attributed to higher dry matter production due to P application. Application of either planofix or ethrel had no impact on total flower production per plant, since these growth regulators do not actually influence the flower production, but seem to prevent abscission and influence retention of flower buds and flowers in grain legumes.

Flower shedding per plant

It was observed that P application significantly reduced the flower shedd-

ing in both the seasons (Table). The effect of growth regulators was observed only in summer. Application of 25 kg P_2O_5 /ha significantly reduced the flower shedding per plant as compared to control and 12.5 kg P_2O_5 /ha in both the seasons. Increasing the P level beyond 25 kg P_2O_5 /ha did not have much effect in reducing the flower shedding. The difference between control and 12.5 kg P_2O_5 /ha was also not significant. Similar finding in cowpea was reported by Kurdikeri et al. (1973).

Foliar spray of planofix at 40 ppm and ethrel at 100 and 150 ppm significantly reduced the flower shedding compared to other treatments. However, the differences among these three treatments were not significant. Similarly the differences among control, water spray and planofix at 20 ppm were also

TABLE Effect of phosphorus and growth regulators on total flower production and flower shedding of cowpea (PLS 370).

Treatments	Summer, 1978				Kharif, 1978			
	Total no flowers produced per plant	No. of pods set per plant	Flower shedding per plant (%)	Grain yield kg/ha	Total flowers produced per plant	No. of pods set per plant	Flower shedding per plant (%)	Grain yield kg/ha
P levels (kg P₂O₅/ha)								
0	58.5	15.2	70.3	751	48.9	10.2	79.0	656
12.5	57.5	17.4	69.5	797	46.7	10.3	77.9	703
25	59.9	21.2	64.3	897	49.3	13.3	72.3	783
37.5	60.9	21.8	64.3	915	45.4	13.8	71.4	783
50.0	57.9	20.8	64.9	858	46.5	11.4	74.8	771
S.E.	1.26	0.96	1.11	23	2.83	0.32	1.71	15
C.D.	S.S.	3.12	3.63	76	NS	1.05	5.56	48
(P = 0.05)								
Foliar Spray of growth regulators								
Control (No spray)	59.8	18.0	70.0	809	43.0	11.6	76.9	737
Water spray*	61.3	17.7	71.1	808	43.6	12.1	72.5	747
Planofix*								
20 ppm	59.6	17.9	69.8	813	50.7	12.0	76.8	743
40 ppm	57.8	22.0	61.8	895	52.2	11.6	77.0	739
Ethrel*								
100 ppm	57.1	20.8	63.5	866	45.3	11.0	74.5	734
150 ppm	58.1	20.9	63.9	871	49.4	11.4	72.8	735
S.E.	2.31	0.92	1.53	19	3.97	0.43	2.21	15
C.D.	NS	2.62	4.33	45	NS	NS	NS	NS

not significant. Foliar application of planofix (NAA) at 40 ppm would have prevented the formation of abscission layer and this might have resulted in reduced flower shedding. Kaul *et al.* (1976) reported that application of planofix at flower initiation stage reduced the flower shedding in cowpea and increased the pod number per plant. Application of ethrel at lower concen-

tration retained more flowers per plant in bean (*Phaseolus vulgaris*).

Quite contrasting to the summer season, foliar application of growth regulators had no influence in arresting flower drop during the *kharif* season. This lack of response might be due to the continuous rain received during flowering, washing out the applied chemical.

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