



SYNERGESTIC AND INHIBITORY EFFECT OF CYCOCELAND UREA ON *CYAMOPSIS TETRAGONOLOBA*

Anamika

Department of Botony, Vardhman College, Bijnor (U.P.), India.

Abstract

Synergistic and inhibitory effect of cycocel and urea spraying observed on growth and yield attributes of *Cyamopsis tetragonoloba*. After the age of one month, four concentration of cycocel in decreasing order given to the plant, which were 1200ppm, 900ppm, 600ppm and 300ppm and two concentration of urea in increasing order used, which were 2% and 3%. All treatments were applied regularly at 15 days interval. It is observed that all characters are increasing with the increasing concentration of cycocel except plant height. But in the case of urea all characters of plant enhance with enhancing concentration of urea *i.e.* 2% and 3%.

Key words : *Cyamopsis tetragonoloba*, urea, cycocel, irrigation, drainage.

Introduction

Cyamopsis tetragonoloba is a important legume crop of west uttar pradesh and here known as “guwar” or “gavar” or “cluster bean”. It grows very well in tropical and even semi-arid areas also but rainfall is necessary in semi arid area. In West Uttar Pradesh it cultivate in june-july as khareef crop. Mostly *Cyamopsis tetragonoloba* (Family- Fabaceae) seeds sow with maize ,bazra etc because it reduce fertilizer requirement. *Rhizobia* nitrogen fixing bacteria lives in their root nodule, also reduce fertilizer requirement for upcoming crop. Pods use as vegetable and good resource of protein. Leaves also can be used like spinach. Another special substance present in their seeds as a source of natural polysaccharide- “galactomannan” (popularly known as “guar gum”). Endosperm consist of very large polysaccharide of galactose and mannose from viscous substance after dissolving in water. Gaur gum used in paper and pulp industry for ore floating, in manufacture of explosives, substance hydraulic frocking of oil and gas formation.

Increment in agricultural and horticultural productions per hectare can be obtained by changing the environment of crop by irrigation, drainage, use of fertilizer like urea, pesticides, herbicides and very important applications of

plant growth substances in form of manufactured chemicals. These are often resemble the hormones in physiological action and even in molecular structure called “Growth regulators”.

The effect of growth regulators vary from crop to crop and even from variety of the same crop in different agro-climate conditions. A large number of endogenous auxins gibberellins and cytokinins enhance plant growth, flowering, fruiting and yield. About more than seventy plants growth regulators are now commercially available like onion compounds such as chloromequate chloride or chlorocholine chloride or CCC (IUPAC name 2-Chloro-N,N,N-trimethylethanaminium) chemical formula $C_5H_{13}ClN$ typically sold as “chloride salt”. It is colorless hygroscopic crystalline substance, soluble in water and ethanol, most important inhibitor of Gibberellin biosynthesis.

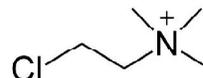


Fig. : Structure of cycocel.

Khan *et al.* (2012) reported that concentration of 2000ppm showed increment in number, average weight, size of flowers, as well as leaves in African marigold (*Tagetes erecta* L) cv. Pusa narangi gairda.

Gautam *et al.* (2014) reported that even concentration of 1000 ppm could also increase in weight of clove bud and onion bulb also. So they recommended for commercial cultivation/application after multilocation testing for getting the higher yields.

Materials and Methods

The experiment was conducted in Botanical garden of Vardhman college, Bijnor during July 2016- Sept 2016 in kharif season. Bijnor is situated at the elevation of 225 meters (738 ft) above mean sea level at 29.37 degree North latitude and 78.13 degree east longitude. The soil of this area originate from shivalik range of Himalaya. Generally sandy-clay-loamy soil yellowish – gray in color present in botanical garden. The soil are naturally fertile and owing to its inherent capabilities the accumulation of grass and foliage has contributed to enrichment of the humus content of the soil. 60-63% sand, 20-22% slit and 11.0-14.2% clay with 40.6(±)2.6% water holding capacity and neutral or slightly alkaline pH. And received average rain fall 100-110cm during July 2016 to Sept 2016

The seeds are sown in field in four replications (Simple randomized block design) after the age of 10 days 4 concentrations of cycocel 1200 ppm, 900 ppm, 600 ppm, 300 ppm and 2 concentration of urea. 2% and 3% were applied regularly at 15days interval. The rate of irrigation was done 3rd and 6th day per week. A random sample of 5 plans from each plot was taken at various time interval *viz.* are 10, 30, 60 days after sowing. The vegetative growth character like plant height, number of leaves, total fresh and dry weight of plant were measured. After 60 days, total yield of pods/plot was recorded and number of seed/pod, dry seed weight (g/100seed), number of pods/plant, average fresh weight of pod/plant, pods weight (gm/100 pod) and total fresh weight of pods/plant also calculated.

Effect of cycocel and urea spraying on average morphological characteristic of cluster bean (*Cyamopsis tetragonolobus*) plant after 10 days

The treatment indicators are given below-

Table 1 :

Indicator	Quantity
T ₁	1200 ppm
T ₂	900 ppm
T ₃	600 ppm
T ₄	300 ppm
T ₅	2% urea
T ₆	3% urea
T _c	T control

Table 2 :

Treat-ment	Average plant height (in cm)	Average no. of leaves/ plant	Bio mass	
			Fresh weight (gm/plant)	Dry weight (gm/plant)
T ₁	2.02	10.6	1.31	0.162
T ₂	2.82	8.2	1.01	0.119
T ₃	3.01	6.6	0.88	0.103
T ₄	3.71	5.0	0.72	0.086
T ₅	4.52	7.10	0.89	0.107
T ₆	5.10	9.02	1.19	0.112
T _c	3.5	4.0	0.50	0.07

Effect of cycocel and urea spraying on average yield attributes of cluster bean (*Cyamopsis tetragonolobus*) plant after 30 days

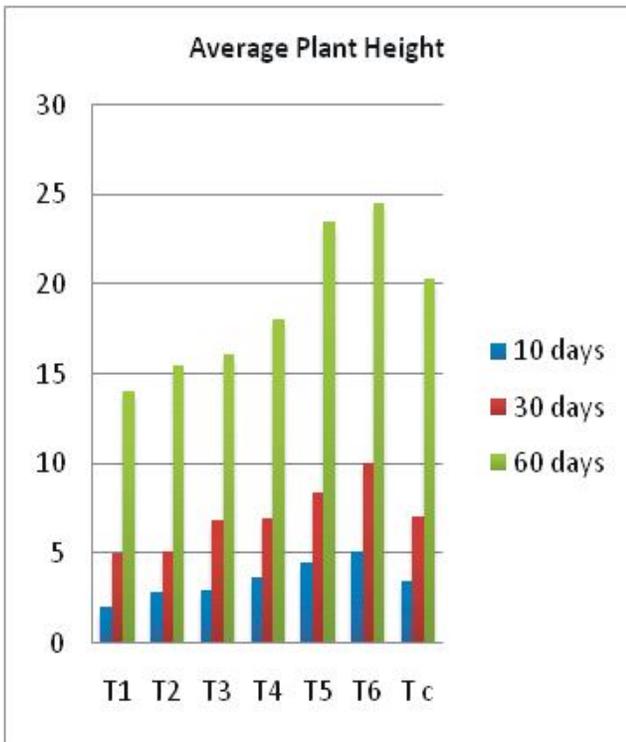
Table 3 :

Treat-ment	Average plant height (in cm)	Average no. of leaves/ plant	Bio mass	
			Fresh weight (gm/plant)	Dry weight (gm/plant)
T ₁	4.99	14.9	1.82	0.312
T ₂	5.15	13.21	1.68	0.300
T ₃	6.85	11.01	1.00	0.284
T ₄	7.01	9.29	0.90	0.250
T ₅	8.42	10.9	1.19	0.197
T ₆	10.09	12.5	1.43	0.261
T _c	7.12	6	0.51	0.109

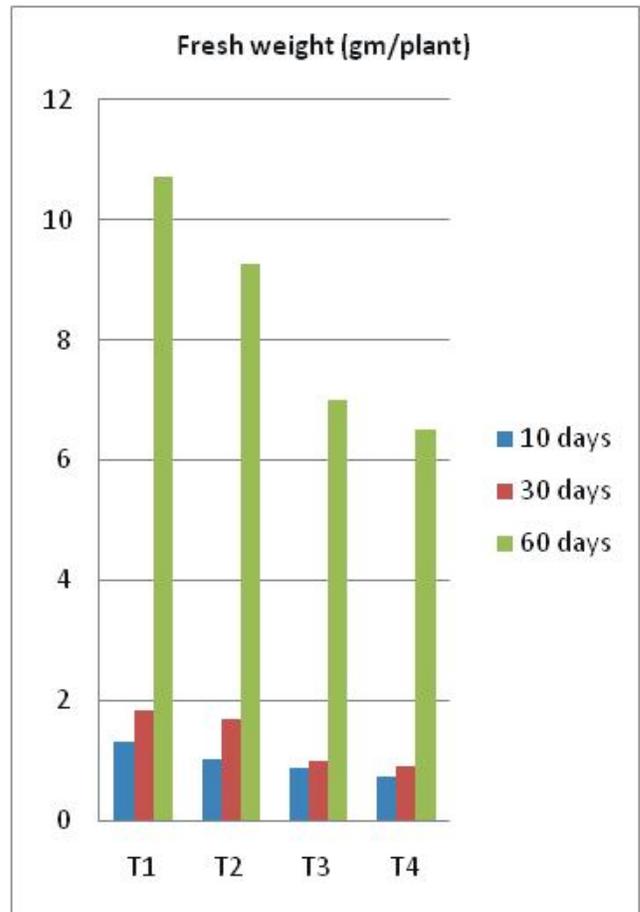
Effect of cycocel and Urea spraying on average yield attributes of cluster bean (*Cyamopsis tetragonolobus*) plant after 60 days

Table 4 :

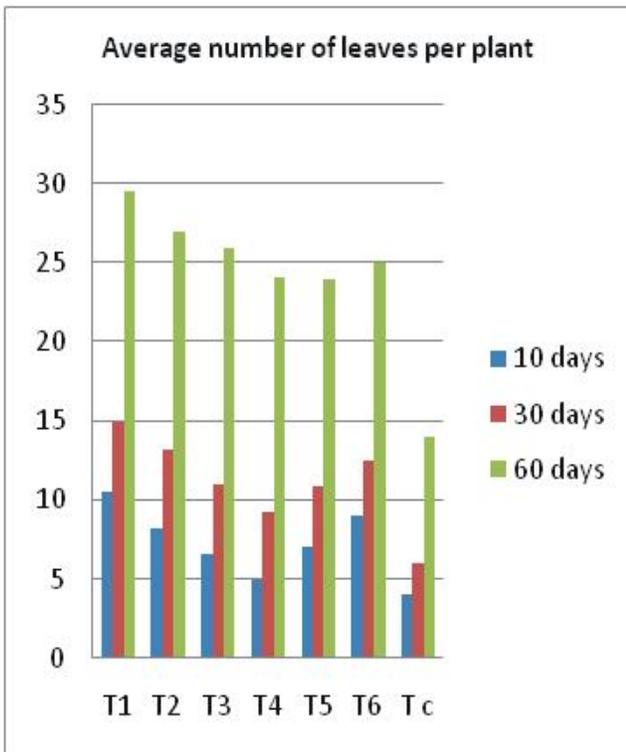
Treat-ment	Average plant height (in cm)	Average no. of leaves/ plant	Bio mass	
			Fresh weight (gm/plant)	Dry weight (gm/plant)
T ₁	14.01	29.51	10.71	1.929
T ₂	15.51	27.03	9.26	1.823
T ₃	16.11	26.00	7.00	1.720
T ₄	18.02	24.10	6.52	1.580
T ₅	23.51	23.98	5.89	1.430
T ₆	24.55	25.01	8.21	1.713
T _c	20.3	14	3.21	0.670



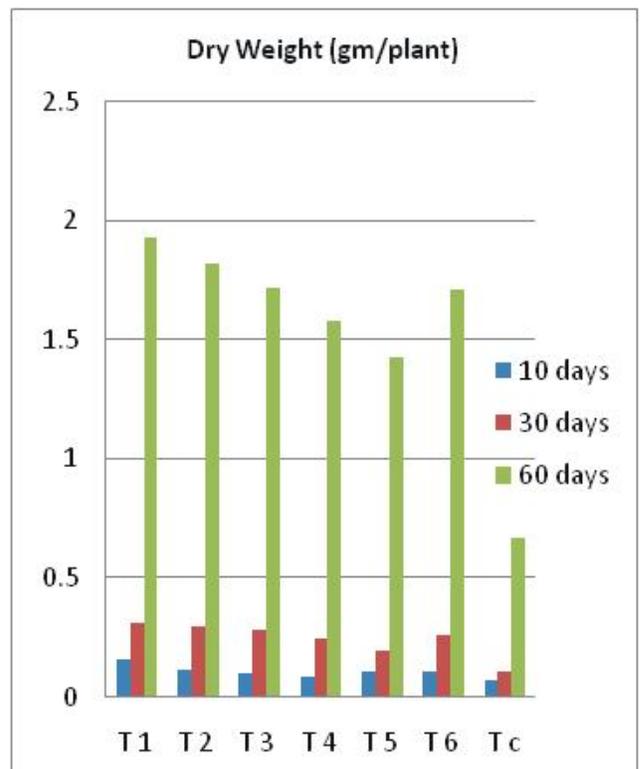
Graph 1 : Average plant height (in cm).



Graph 3 : Fresh weight (gm/plant).



Graph 2 : Average number of leaves per plant.



Graph 4 : Dry weight (gm/plant).

Effect of cycocel and urea spraying on average yield attributes of cluster bean (*Cyamopsis tetragonoloba*) plant after 60 days (i.e. harvesting time) (table 5)

Table 5 :

Treatment	Average number of pods/plant	Average fresh weight of pods per plant(in gm)	Average weight of pods (gm per 100 seeds)	Average total fresh weight of seeds per plant (in gram)	Average number of seeds per plant	Average dry seed weight (in gram per 100 seeds)
T ₁	39.20	4.42	170.00	1.23	7.01	1.84
T ₂	36.80	4.01	168.32	1.19	6.73	1.79
T ₃	32.90	3.99	166.90	1.16	6.19	1.75
T ₄	30.00	3.89	164.17	1.15	6.08	1.71
T ₅	28.00	3.09	163.10	1.09	5.92	1.62
T ₆	32.02	3.91	165.29	1.12	6.01	1.69
T _c	24	2.84	158.13	1.02	5.21	1.58

Results and Discussion

Effect of cycocel and urea spraying was study after 10 days, 30 days and 60 days finally. Maximum plant height obtained during 3% urea spraying in all the treatments and 1200 ppm concentration show minimum plant height at each study level.

Maximum average no of number of leaf/plant obtained at 1200 ppm concentration of cycocel while 3% of urea also increased number of leaves significantly at 10, 30, and 60 days interval.

Application of 1200 ppm concentration of cycocel and 3 % urea gives maximum average fresh weight and dry weight of biomass which were 1.31 gm/plant (average fresh weight), 0.162 gm/plant (Average dry weight) respectively during cycocel treatment. During 3% urea treatment average fresh weight 1.19 gm/plant and average dry weight was .112 gm/plant after 10 days of transplantation of crop plant.

After 30 days and 60 days 3 % urea spray gave more average fresh weight of biomass gm/plant which was 1.43 and .261 (after 30 days) and 8.21 and 1.713 after 60 days respectively. While 1200 ppm concentration of cycocel gave better result than 3% urea, which were 1.82 gm/plant, Average fresh weight is 0.312 gm/plant average dry weight respectively after 30days. After 60 days value became 10.71 gm/plant (average fresh weight) and 1.929 gm/plant (average dry weight).

Yield characters like number of pods/plants, fresh weight of pods/plants, average weight of pods (gm/100 seeds), total fresh weight of pods/plant, number of seed/plant, dry seed weight (gm/100seed) also increased during treatments. 3% urea shows better results than 2% urea. 1200ppm concentration of cycocel gave best result during experiment and it was found that maximum yield in pods as well as seeds also. Number and weight of pods and seeds all are increased with increase in concentration of cycocel respectively.

All result show that growth and yield attributes increase significantly except plant height during cycocel and urea treatment. Cycocel improve productivity of chickpea (Sesharilath, 1981), green gram, pigeon pea, and chickpea (Bengal *et al.*, 1982). They also reported that foliar spray of cycocel growth retardants on chick pea at 30 and 60 days after germination decreased plant height, hundred seeds weight but increased branching leaf and pods formation, seed set and plant yield.

It can be concluded that 1200ppm concentration of cycocel and urea spraying provide good yield of cluster bean. It is advisable that in western tract of Uttar Pradesh, cluster bean can be grown with more profit by application of cycocel as well as urea and cluster bean may becomes good alternate source of food and fodder.

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