J. Soils and Crops 27 (1) 281-282, June 2017 ISSN 0971-2836

Short communication :

EFFECT OF CYCOCEL AND PACLOBUTRAZOL ON SEED YIELD OF ANNUAL CHRYSANTHEMUM

A.R. Jagdale[1], Y. R. Khobragade[2], A. A. Ganorkar[3] and R. R. Girange[4]

Annual chrysanthemum belong to family Asteraceae. It is also known as 'Garland chrysanthemum' or 'crown daisy'. It is hardy annual flower and resistance to disease pest attack with less cultural practices so now a days popularity of this crop increasing among farmers for production of economic yield. Therefore, it is necessary to use a good quality seeds for flower and seed yield. Good quality seed increase germination percentage and better seedling growth. Commercial seed production has unrestricted revolutionary growth in terms of number of loose flower crop and their varieties. Assessment of world seed demand, its consistency or stability and the approximate pricing structure identifying best areas for quality seed production and determination potential based on existing global demand for seed and facilities available.

In annual flower crops, seed yield is mainly dependent on number of flower bearing branches which can be manipulated by arresting the vertical growth of plants and encouraging side shoots. Such side shoots would provide more scope to bear flowers and contribute for higher seed yield. The plant growth retardants are used to overcoming the factors limiting the growth and yield to harness maximum benefit from seed production. It arrest vertical growth, promote lateral branches, ultimately increase in number of flowers, seeds flower^{-1}, plant^{-1}, and hectare^{-1}. Considering the above facts present investigation was under taken to study effect of cycocel and paclobutrazol on seed production of annual chrysanthemum.

The present field experiment was carried out at Horticulture Section, College of Agriculture, Nagpur during *rabi* season of the year 2015-2016 with nine treatments in Randomised Block Design. The treatments comprised viz., T_1– Control, T_2- Cycocel 1000 ppm, T_3-Cycocel 1500 ppm, T_4- Cycocel 2000 ppm, T_5- Cycocel 2500 ppm, T_6- Paclobutrazol 20 ppm, T_7- Paclobutrazol 30 ppm, T_8- Paclobutrazol 40 ppm and T_9- Paclobutrazol 50 ppm.

The annual chrysanthemum seeds were sown 25 days before the actual transplanting on previously sterilized raised bed of 3m x 1m x 0.15 m and seedlings were prepared. Necessary care was taken to raise healthy and strong seedlings for transplanting. Seedlings were transplanted on raised bed with planting of one seedling hill^{-1} in the experimented field on 15 October, 2015 at the distance of 60 cm x 45 cm. Recommended dose of farm yard manure and chemical fertilizers for annual chrysanthemum was 5 tonnes ha^{-1} FYM and 100:50:50 NPK kg ha^{-1}was applied. The half dose of nitrogen and full dose of phosphorus and potassium were applied at the time of transplanting. The remaining half dose of nitrogen (N) was applied one month after transplanting.

The common pinching was done at 15th days after transplanting. The solutions of cycocel (1000, 1500, 2000, 2500 ppm) and paclobutrazol (20, 30, 40, 50 ppm) were prepared by taking the required quantity of chemical diluted with alcohol and required volume was maintained water as per the treatment concentrations. The cycocel and paclobutrazol of the respective concentration were sprayed once, at 25 DAT as per the treatments.

Seed yield parameters

The results on the effect of cycocel and paclobutrazol on seed production of annual chrysanthemum are presented in table 1.Significantly, maximum number of flowers plant^{-1}(106.00) recorded in treatment cycocel 2500 ppm.In next order treatments were paclobutrazol 40 ppm (102.00), cycocel 2000 ppm (100.02), and paclobutrazol 30 ppm (96.01). Whereas, significantly minimum number of flowers plant^{-1} was recorded with control treatment (82.06). The results obtained in this investigation are in line with the findings of Shivankar *et al.* (2014), who reported that cycocel 1000 ppm sprayed at 30 and 45 days after transplanting significantly increased number of flowers plant^{-1},whereas minimum number of flowers reported in control treatment. In respect of number of seeds flower^{-1} were noticed significantly maximum with treatment cycocel 2500 ppm (202) and at par with treatments cycocel 2000 ppm (196) and cycocel 1500 ppm (194). Whereas minimum number of seeds flower^{-1} was noticed in paclobutrazol 50 ppm (180).Significantly, highest seed yield plant^{-1} was obtained under the treatment cycocel 2500 ppm (51.38 g) and paclobutrazol 40 ppm (46.02 g) . The lowest seed yield plant^{-1} was obtained in control treatment (26.20 g).It has been observed that significantly highest seed yield plot^{-1} was recorded under the treatment cycocel 2500 ppm (1.54 kg) followed by paclobutrazol 40 ppm (1.38 kg), cycocel 2000 ppm (1.34 kg) and cycocel 1500 ppm (1.20 kg). The lowest seed yield plot^{-1}observed in control treatment (0.78 kg). It has been observed that significantly highest seed yield hectare^{-1} was noticed under the treatment cycocel 2500 ppm (11.33 q). Treatments paclobutrazol 40 ppm(10.21 q) and cycocel 2000 ppm (9.92 q) were next in order. The lowest seed yield plot^{-1} was in treatment control (5.57 q). Foliar application of plant growth retardants increases stem diameter, suppresses terminal bud growth and also decreases inter nodal distance, as a result it increases

1, 3 & 4.P.G. Students, Horticulture Section, College of Agriculture, Nagpur (M.S.)
2 Asstt. Professor, Horticulture Section, College of Agriculture, Nagpur (M.S.)

Table 1.Effect of cycocel and paclobutrazol on seed production of annual chrysanthemum

Treatments	Number of flowers plant^{-1} at 90 DAT	Number of seeds flower^{-1}	Seed yield plant^{-1} (g)	Seed yield plot^{-1} (kg)	Seed yield ha^{-1} (q)	Test weight (g)	Germination (%)
T_1- Control	82.06	182	26.20	0.78	5.57	1.80	76.33
T_2– CCC 1000 ppm	88.00	188	33.08	0.99	7.33	2.00	78.19
T_3- CCC 1500 ppm	94.03	194	40.48	1.20	8.94	2.22	82.18
T_4- CCC 2000 ppm	100.00	196	44.88	1.34	9.92	2.29	87.85
T_5- CCC 2500 ppm	106.00	202	51.38	1.54	11.33	2.40	89.32
T_6– PCB 20 ppm	90.01	186	31.50	0.93	6.88	1.90	78.48
T7-PCB 30 ppm	96.01	190	37.39	1.11	8.22	2.05	82.62
T_8– PCB 40 ppm	102.00	192	46.02	1.38	10.21	2.35	86.19
T_9- PCB 50 ppm	93.33	180	33.84	1.01	7.48	2.02	81.44
SE (m) ±	3.36	5.45	0.52	0.03	0.28	0.09	2.42
CD at 5%	10.14	16.36	1.59	0.10	0.86	0.28	7.28

***DAT-Day After Transplanting, CCC- Cycocel, PCB- Paclobutrazol**

internodal count on main axis and produces maximum number of branches plant^{-1}. So accumulation of metabolites get translocate towords lateral branches that helps to maximum carpohydrate production in plant which helps to increased flowers and seeds yield. Sainath *et al.* (2012) found that, significantly higher number of seeds flower^{-1}recorded with the application of cycocel @ 1000 ppm and cycocel @ 2000 ppm as compared to control in chrysanthemum (*Chrysanthemum coronarium* L.)

Seed quality parameters

Test weight of annual chrysanthemum seed was significantly influenced by the foliar application of cycocel and paclobutrazol. The treatment cycocel 2500 ppm significantly reported maximum test weight (2.40 g), and at par with treatments paclobutrazol 40 ppm (2.35 g), cycocel 2000 ppm (2.29 g) and cycocel 1500 ppm (2.22 g). The increase in test weight might be due to increase in weight of individual seed.Whereas, significantly minimum test weight of seeds flower^{-1} were recorded in control (1.80 g).Germination percentage significantly influenced by the foliar application of cycocel and paclobutrazol. The treatment cycocel 2500 ppm recorded significantly maximum germination (89.32%). Treatments cycocel 2000 ppm (87.85%), paclobutrazol 40 ppm (86.19%), paclobutrazol 30 ppm (82.62%) and cycocel 1500 ppm (82.18%) were found next in order. Whereas significantly minimum germination was recorded under the control treatment (76.33%). The increase germination might be due to adequate supply of food to resume embryo macromolecule which is to be utilized in growth promotional process.The higher weight of seeds seen by foliar application of cycocel was due to maximum utilization of reserved food materials and increased mobilization of biomass to seed from the source to sink which resulted higher seed weight. Sainath *et al.* (2014) observed that, the foliar spray of cycocel @ 1000 ppm and 2000 ppm at 30 and 40 DAT significantly improved the number of capitulum plant^{-1}, capitulum diameter, dry weight of capitulum, 1000 seed weight and seed yield plant^{-1} and ha^{-1} as compared to control in annual chrysanthemum (*Chrysanthemum coronarium* L.).

REFERENCES

Sainath, D.S. Uppar and M.K. Meena, 2012.Effect of different plant growth regulators on growth, quality, yield and yield components in chrysanthemum (*Chrysanthemum coronarium* L.).Inter. J. Plant Sci.**7**(1):10-17.

Sainath, D.S. Uppar, V.S. Patil, V. K. Deshpande and R. Hunje, 2014. Effect of different growth regulators on seed yield and quality attribute in annual chrysanthemum (*Chrysanthemum coronarium* L.).Karnataka J. Agric. Sci.**27** (2):131-134.

Shivankar, S. K.,Sushma Lokhande, D. M. Panchbhai and S. A. Badge, 2014. Effect of pinching and cycocel on growth and flower yield of annual chrysanthemum. J. Solis and Crops. **24** (2): 338-340.

Rec. on 03.06.2016 & Acc. on 05.07.2016