IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)
ISSN (P): 2347-4580; ISSN (E): 2321-8851
Vol. 5, Issue 11, Nov 2017, 1-6

EFFECT OF WEED AND NUTRIENT MANAGEMENT ON DENSITY OF VARIOUS WEEDS AND YIELD OF CORIANDER (*Coriandrum Sativum* L)

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ABSTRACT

A field experiment was conducted at Udaipur (Rajasthan), to find out the effective weed and nutrient management practice, in coriander. Amongst eight weed species identified, only *Chenopodium murale* L, *Spergula arvensis* L. and *Melilotus indica* was found, the most dominate. Two HW at 30 and 45 days after sowing and pendimethalin 1.0 kg/ha + HW at 45 DAS were found superior over rest of the treatments with respect to control of density of all weeds and coriander seed yield. For the control of *Spergula arvensis* population, Two HW at 30 and 45 days after sowing stands the best practice of weed management, in coriander. Application of metribuzin 0.30 kg/ ha at pre-emergence was found least effective, in the control of various weeds and improving coriander seed yield, compared to other treatments under test. Nutrient management involving N+P+K+S application, though enhanced density of all weeds, as compared to N+P and N+P+K application, but the difference was found statistically non significant. The balanced fertilization, significantly increased the seed yield of coriander with the maximum peak at 60 kg N+ 30 kg P + 30 kg K + 30kg S/ha.

KEY WORDS: Weed Density, Yield, Coriander

INTRODUCTION

Among the spices, coriander (*Coriandrum sativum* L.) is a well known spice crop for its uses as medicine, oil, perfumery and culinary purpose. It is consumed in large quantities and earns a large sum of foreign exchange every year, through export. Area under this crop is increasing, mainly due to industrial support with the growth of processing industries. It has been found to be a remunerative crop, in *Rabi* season and very economical crop, in medicinal and aromatic plants based cropping systems. Coriander is cultivated under irrigated conditions and is subjected to vigorous competition, with a variety of weeds, which often inflict yield losses up to 60 % and even more (Kushwaha *et al*, 2002). Thus, knowledge of important weed flora, associated with this crop is essential to chalk out an effective weed programme. The present study was an attempt, to have detailed account of prominent weeds, associated with coriander under the influence of weed and nutrient management.

MATERIALS AND METHODS

A field experiment was conducted, at Instructional Farm, Rajasthan College of Agriculture, Udaipur, during *Rabi* seasons of 2002-03 and 2003-04. The soil of the experimental field was clay loam in texture, slightly alkaline in reaction (pH 8.1), medium in available N & P and high in available K. Thirty three treatment combinations, consisting of 11 weed management treatments [weedy check, one hand weeding (HW) at 30 DAS, two HW at 30 and 45 DAS, pendimethalin 1.0 kg/ha, oxyfluorfen 0.25 kg/ha, metribuzin 0.30 kg/ha, oxadiargyl 75 g/ha, pendimethalin 1.0 kg/ha + HW at 45 DAS,

oxyfluorfen 0.25 kg/ha + HW at 45 DAS, metribuzin 0.30 kg/ha + HW at 45 and oxadiargyl 75 g/ha + HW at 45 DAS] in main plots and 3 balanced fertilization treatments (N_{60} + P_{30}, N_{60} + P_{30} + K_{30} and N_{60} + P_{30} + K_{30} + S_{30} kg/ha) in subplots, were tested in split plot design, with 3 replications. Coriander variety 'CS-6' was sown on 16th and 23rd October and harvested on 20th and 28th February, in the respective seasons. The required quantity of test herbicides, for each plot was calculated and solution of each herbicide was prepared, using water at 800-liter/ha. Herbicidal solutions were sprayed 2 DAS, as pre emergence spray, with the help of knapsak sprayer using flat fan nozzle. As per schedule, hand weeding in the respective plots was done, with hand hoe (Kudali). All the fertilizer nutrients viz., half dose of nitrogen and full doses of phosphorus, potassium and sulphur were applied, as basal application before sowing as per treatment. Remaining half dose of N was applied, as top dressing at 30-32 DAS. Weed density at 75 days, after sowing was recorded by counting the individual weeds, presented in 0.25 m^2 area from each net plot, ascertained by using 0.5 m × 0.5 m quadrate spelling. In order to make data more valid, data of weed density were subjected to square root transformation using $\sqrt{X + 0.5}$.

RESULTS AND DISCUSSIONS

Coriander was infested with eight species of weeds belonging to seven different families, consisted of *Chenopodium murale* L, *Spergula arvensis* L, *Melilotus indica* (L.) All, *Anagallis Arvensis* L, *C. album* L, *Convolvuls arvensis* L, *Cyperus rotundus* L. and *Cynodon dactylon* L. Out of these weeds, *Chenopodium murale* L belonging to chenopodiaaceae, *Spergula Arvensis* L., belonging to cryophyllaceae and *Melilotus indica* (L.) All, belonging to leguminosae family were the most dominating dicot weeds, responsible for deleterious effect on crop. It emerged out that, these weeds has the fast growth right from the sowing of crop, make a thick mate on the soil surface, ceased growth after 60-70 days of its emergence and later on start decaying. These weeds together constituted 53.11 per cent of total weed density and *Chenopodium murale*, alone shared 24.85 percent (Table 1). Among monocots, density of *Cyperus rotundus* was found maximum, during both the years. *Cyperus rotundus* L. have quick regeneration and survival capacity as well as greater competitive ability than the other weeds. It emerged comparatively late, in the field and continued growth, up to later stage of the crop growth. The extent of coriander seed yield, under the influence of weed management treatments was inversely, correlated with the increase in weed density, while it increases with increase in fertility levels, under the influence of nutrient management treatments.

Effect of Weed Management

Data on density of various weeds revealed that, two HW (30 and 45 DAS) was found the most effective, in controlling all weeds, observed during the study. Pendimethalin 1.0 kg/ha as pre emegence + HW at 45 DAS, was found equally effective in controlling weeds, as that of two HW. Both of these treatments gave significantly higher seed yield, over rest of the treatments and increased the seed yield by 200.57 and 198.67 per cent, respectively compared to weedy check. The superiority of both these treatments might be due the fact that these treatments effectively controlled early as well as late flushes of weeds. Thus, reduced crop weed competition caused lesser drain of nutrients together with lesser competition to other growth factors. Results corroborate with the findings of Choudhary (2000) and Choudhary and Gupta (1991).

Two HW remained at par, with Pendimethalin 1.0 kg/ha as pre emegence + HW, in reducing density of *Chenopodium murale, Melilotus indica, Anagallis arvensis, Chenopodium album, Convolvuls arvensis, Cyperus rotundus* and *Cynodon dactylon*. For *Spergula arvensis*, two HW found superior treatment over the rest of practices. Further,

pendimethalin + HW, significantly reduced the density of *Spergula arvensis, Melilotus indica and Convolvulus arvensis,* over all herbicides tested with HW combination and remained statistically, at par with oxyfluorfen 0.25 kg/ha + HW (45 DAS), in reducing density of *Chenopodium murale, Anagallis arvensis, Chenopodium album, Cyperus rotundus and Cynodon dactylon*. Pendimethalin being dinitroaniline, is known to be absorbed by germinating weeds and inhibits cell division in meristematic tissues, so that most of weeds die within few days of their emergence. The superiority of pendimethalin, over other herbicides could be ascribed to be due to the fact that, pendimethalin is less susceptible to degradation in soil system (Eshel *et al*, 1979), it appears that, the effectivity of this herbicide in suppressing the weed growth, could be continuous for a longer time, during crop growth period. High persistence of pendimethalin and its favorable effect on season long weed control, has also been reported by Sharma (2001). Density of *Spergulla arvensis* and *Melilotus indica* was found significantly lower, under oxadiargyl 75 g/ha + HW (45 DAS), compared to oxyfluorfen + HW, mertibuzin +HW and one HW. Treatments oxadiargyl + HW, mertibuzin +HW and one HW fail to show any significant variation, to reduce the density of *Chenopodium murale, Anagallis arvensis, Cyperus rotundus* and *Cynodon dactylon*. Among, all the herbicidal treatments, metribuzin resulted in poorest weed control over weedy check, especially at later stages which might be due to its high water solubility and less persistence in soil system. It is rapidly hydrolysed in water and susceptible to leaching losses (Rao, 2000). High pH of experimental soil (pH 8.1), also favoured its loss through leaching in to deeper soil layers. Another possible reason may be that, this herbicide is less effective on grasses, than dicot weeds (Tripathi, 1995). Under favourable moisture conditions, recurrence of weeds takes place at much faster rate and this herbicide was unable to take care of later germinated weeds. Hence, the total weed control due to metribuzin was on poor side.

The application of herbicides integrated with one HW at 45 DAS reduced total weed density and dry matter most efficiently during entire crop season compared weedy check and individual herbicide application. This might be due to the fact that pre-emergence herbicide controls early flushes of weeds, while hand weeding destroyed mid-late flushes of weeds. Hence, crop could remain weed free for comparatively longer duration than herbicide alone application.

Effect of Nutrient Management

Data on weed density at under the influence of nutrient management revealed that these treatments though increased the density of all weeds but failed to produce any significant difference in weed density of individual weed species at 60 DAS. Nutrient managament favourably improved the seed yield of coriander. The highest seed yield of 12.19 q/ha was obtained when crop was fertilized with N+P+K+S wherein significant improvement to the extent of 18.00 and 8.36 per cent was obtained over application of N+P and N+P+K, respectively. Overall improvement in crop yield under balanced nutrition of N, P, K and S seems to be on account of their potential role in modifying soil and cellular environment conducive for better development of growth parameters and ultimately realized into higher seed yield. The results of present investigation are alike to the findings of Tripathi *et al.* (2001).

CONCLUSIONS

Pendimethalin + hand weeding at 45 DAS with N+P+K+S fertilization, observed to be the best treatment combination, for controlling the density of weed flora and realization of highest seed yield in coriander.

REFERENCES

1. Choudhary, G.R. 2000. Weed population dynamics and fennel (*Foeniculum vulgare*) growth as influenced by integrated weed management. *Indian J. Agron.* **45:**421-428.
2. Choudhary, G.R. and Gupta, O.P. 1991. Response of cumin (*Cuminum cyminum*) to nitrogen application, weed control and sowing methods. *Indian J. Agron.* **36**: 212-216.
3. Eshel, Y, Oheli, Y, Garjig, G, Yager, D. and Azad, I. 1979. Pendimethalin a new selective herbicide for cotton and other crops. *Phytoparasitica* **7** : 143.
4. Kushwaha, H. S, Tripathi, M. L. and Singh, V. B. 2002. Weed management in coriander (Coriandrum sativum). Presented at second International Agronomy Congress at New Delhi, India on Nov. 26-30, 2002.
5. Rao, V.S. 2000. Principles of weed science. Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.
6. Sharma, R.P. 2001. Effect of weed management and phosphorus levels on growth and yield of mustard [*Brassica juncea* (L.) Czern and Coss] and their residual effect on fodder maize (*Zea mays* L.). Ph.D. Thesis, MPUAT, Udaipur (Rajasthan).
7. Tripathi, A.K. 1995. Studies on chemical control of weeds in potato (*Solanum tuberosum* L.) cultivar *kufri chandramukhi*, M.Sc. (Ag.) Thesis, RAU, Bikaner (Rajasthan).
8. Tripathi, A.K, Pandya, R.K. and Tripathi, M.L. 2001. Effect of nitrogen, phosphorus and potassium on stem gall disease and yield of coriander. *Ann. Plant Prot. Sci.* **9** : 337-339.

Table1: Weed density* (No/m^2) and coriander seed yield (q/ha) as affected by weed and nutrient management (Pooled data of 2002-03 and 2003-04)

Treatments	Chenopodium Murale (D)	Spergulla Arvensis (D)	Melilotus Indica (D)	Anagallis Arvensis (D)	Chenopodium Album (D)	Convolvulus Arvensis (D)	Cypress Rotundus (M)	Cynodon Dactylon (M)	Seed Yield
Weed Management									
Weedy check	7.51 (56.00)	6.13 (37.23)	5.18 (26.42)	4.62 (20.92)	4.25 (17.60)	4.52 (19.93)	5.47 (29.40)	4.26 (17.77)	5.27
One HW (30 DAS)	3.22 (9.94)	3.27 (10.31)	3.31 (10.58)	2.92 (8.10)	2.92 (8.04)	2.69 (6.80)	3.24 (10.09)	2.39 (5.27)	12.31
Two HW (30 and 45 DAS)	1.87 (3.11)	1.84 (2.95)	1.90 (3.28)	1.80 (2.81)	1.53 (1.90)	1.65 (2.26)	2.39 (5.37)	1.43 (1.625)	15.84
Pendimethalin 1.0 kg/ha	2.27 (4.48)	2.58 (6.30)	2.71 (6.69)	2.29 (4.80)	2.13 (4.07)	2.15 (4.12)	3.59 (12.39)	2.36 (5.09)	10.40
Oxyfluorfen 0.25 kg/ha	2.69 (6.87)	3.35 (10.91)	3.36 (10.88)	2.37 (5.13)	2.25 (4.57)	2.34 (5.16)	3.79 (13.87)	2.43 (5.48)	8.99
Metribuzin 0.30 kg/ha	3.87 (14.50)	3.82 (14.11)	3.27 (10.26)	3.66 (13.03)	3.03 (8.80)	2.79 (7.29)	4.26 (17.64)	3.25 (10.16)	8.27
Oxadiargyl 75 g/ha	3.37 (10.91)	2.70 (6.82)	2.85 (7.73)	3.42 (11.21)	2.90 (7.96)	2.68 (6.72)	4.13 (16.80)	3.23 (9.94)	8.53
Pendimethalin 1.0 kg/ha + HW(45 DAS)	1.97 (3.52)	2.11 (4.10)	1.92 (3.33)	1.86 (3.00)	1.66 (2.29)	1.76 (2.65)	2.56 (12.42)	1.62 (2.19)	15.74
Oxyfluorfen 0.25 kg/ha + HW(45 DAS)	2.22 (4.53)	2.82 (7.48)	3.07 (9.11)	2.03 (3.74)	1.82 (2.92)	2.05 (3.71)	2.72 (6.94)	1.84 (2.91)	13.26
Metribuzin 0.30 kg/ha + HW(45 DAS)	3.17 (9.66)	3.42 (11.48)	3.22 (9.88)	2.86 (7.72)	2.83 (7.50)	2.64 (6.52)	3.23 (9.92)	2.39 (5.28)	12.48
Oxadiargyl 75 g/ha + HW (45 DAS)	3.02 (8.68)	2.38 (5.17)	2.27 (4.68)	2.79 (7.28)	2.69 (6.75)	2.46 (5.65)	3.02 (8.63)	2.28 (4.85)	12.77
CD (P=0.05)	0.28	0.26	0.28	0.20	0.19	0.22	0.23	0.23	0.80
Balanced fertilization (kg/ha)									
60 N + 30 P	3.17 (11.85)	3.08 (10.38)	2.97 (9.12)	2.76 (7.86)	2.51 (6.40)	2.51 (6.38)	3.46 (12.24)	2.48 (6.36)	10.33
60 N + 30 P + 30 K	3.20 (12.02)	3.13 (10.59)	3.00 (9.38)	2.79 (8.01)	2.55 (6.59)	2.52 (6.43)	3.49 (12.45)	2.50 (6.40)	11.25
60 N + 30 P + 30 K + 30 S	3.23 (12.24)	3.18 (10.89)	3.04 (9.61)	2.80 (8.06)	2.58 (6.75)	2.54 (6.49)	3.52 (12.74)	2.52 (6.47)	12.19
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	0.34

Values are $\sqrt{(x + 0.5)}$ transformed, ( ) Original Values, D stands for dicot and M stands for monocot weeds