

INFLUENCE OF **SIMAZINE** ON THE CHEMICAL **CONSTITUTION** OF MATURE CORN (*ZEA MAYS* L.)

L. SUSEELA DEVI

University of Agricultural Sciences, Bangalore, Karnataka, 560024

The vast development of organic weed killers has brought a major revolution in agricultural and horticultural practices. But, plant being a delicately balanced organism, any single change will have multiple effects. Therefore, the herbicide chemical definitely deranges the physiology of a plant. The reports published over the past few years about the changes in nutrient quality of crop plants as affected by different herbicides are conflicting. Changes in N content due to the application of simazine in different plants have been reported by Ries *et al.*, (1963), Conner (1969) and Wu (1971). The present study was to find out whether the pre-emergent application of simazine at different levels could change the chemical composition of mature corn plants.

Materials and Methods

A field experiment was laid out in the Botanical Gardens of the University of Agricultural Sciences, Bangalore. The experiment was a randomised block design with four replications. The treatments were simazine at the rate of 0.625, 1.25 and 2.5 Kg ai/ha, apart from a control with no herbicide treatment. The seeds of hybrid corn var. Deccan hybrid were used and the fertilizers were applied as per the University's package of practices. The herbicidal treatments were given one day after sowing. Simazine for each plot was suspended in water and sprayed on the soil surface using a hand sprayer. After the harvest, the samples of leaves, stems and grains were collected and prepared separately. The total N was estimated by micro Kjeldahl method of Jackson (1967). Soluble protein content of seed material was extracted according to the method of West (1962) and determined by the method of Lowry *et al.*, (1951). Inorganic phosphorus was determined by the method of Pons and Guthrie (1946). The wet digestion of plant samples were carried out as described by Piper (1950) for the analysis of total P, K, Ca, Mg, Fe, Mn and Ca.

Results and Discussion

The results are presented in Table 1. Nitrogen in corn seeds increased significantly with all levels of simazine applied. Nitrogen increased in leaves treated with simazine at 2.50 kg ai/ha. The N status of corn stem was unaffected. Though triazines are widely used as herbicides, they have got the potentialities of increasing the nitrogen and protein contents of several plant species as reported by Chmiel and Ries (1967) and Tweedy and Ries, (1970)

Table 1 Effect of **pre-emergent** application of simazine on the composition of mature corn plants

Constituents	Control	TREATMENTS			C. D.	
		Simazine@ 0.625 kg ai/ha	Simazine@ 1.25 kg ai/ha	Simazine@ 2.50 kg ai/ha		
Total N (%)	G	1.82	2.03	2.22	2.24	0.10
	S	0.64	0.55	0.52	0.5J	N.S.
	L	1.26	1.24	1.28	1.43	0.12
Soluble Protein (%)	G	4.45	5.05	5.12	5.65	0.72
Total P (%)	G	0.28	0.31	0.26	0.27	NS
	S	0.16	0.16	0.19	0.17	NS
	L	0.08	0.08	0.09	0.09	0.01
Inorganic P (ppm)	G	330.00	330.00	350.00	360.00	2.77
	S	230.00	231.00	200.00	210.00	NS
	L	350.00	370.00	410.00	380.00	NS
Total K (%)	G	0.35	0.36	0.34	0.35	NS
	S	1.04	1.05	1.06	1.05	NS
	L	2.05	2.08	2.12	2.15	NS
Total Ca (me/100 g)	G	2.90	3.20	2.80	2.40	0.46
	S	13.90	16.00	13.90	14.00	1.42
	L	36.60	41.20	42.20	36.50	NS
Total Mg (me/100 e)	G	7.60	7.80	10.20	8.70	1.87
	S	8.40	7.00	6.80	6.90	0.69
	L	28.10	28.40	28.50	26.60	NS
Total Fe (ppm)	G	518.00	552.20	540.00	538.10	17.55
	S	724.70	673.90	557.40	505.30	124.50
	L	1118.00	1156.80	1177.30	1114.60	NS
Total Mn (ppm)	G	7.10	6.80	7.00	7.10	NS
	S	7.40	9.70	10.20	7.10	1.63
	L	36.80	36.80	38.10	40.20	2.24
Total Cu (ppm)	G	6.20	7.30	6.40	6.40	0.83
	S	7.40	6.90	6.80	6.80	NS
	L	14.90	16.80	16.50	15.20	NS

G = Grain, S = Stem, L = Leaves, NS = Not significant

Therefore, even at the concentrations used in the present study, it induced the plants to take up more N and **synthesise** more protein. The change in the rate of N uptake and consequent shift in N **metabolism** at the early growth stage **manifested** in the composition of mature seeds **also**. Nitrogen being a highly mobile element, its speedy depletion from the vegetative parts and movement to grains are **possible especially** at the fruiting stage. The increased N uptake at the early stages of growth under the influence of herbicide will also be translocated to the seeds. But, with highest dose, a considerable **accumilation** of N might **have** occurred to give significant increase of N even in vegetative parts. Content of water soluble protein also showed a similar trend as that of N. The total P showed significant **increase** in the foliage while the **inorganic** P content did not significantly **increase**. The excess P noticed in the leaves may be in the bound form or esterified form. But, the highest herbicide dose caused an **increase** in inorganic P content of seeds. Probably, high labile P compounds actively participating in carbohydrate metabolism might have contributed to this fraction substantially in seeds. Potash content was practically unaffected. Simazine at all levels caused an **increase** in the Fe content of corn seeds. A corresponding decrease in stem samples with no significant change in levels was also noticed. It is likely that distribution was affected rather than uptake. Copper content increased **significantly** by simazine only in seeds. Corn leaves recorded significantly higher values of Cu. Similarly, sub **herbicidal** and **herbicidal** doses caused increased Mn content in stem.

Summary

The application of simazine increased the per cent of N, Cu and **soluble** proteins in corn seeds. A significant increase in the amount of total P in corn leaves and inorganic P in corn **seeds** noticed by application of simazine @ 1.25 and 2.50 kg ai/ha respectively. Uptake and distribution of K was not affected. **Increased** uptake of Ca was observed and it was uniformly distributed among different parts of plants, whereas **Mg** distribution was very much affected by herbicide treatment rather than its uptake. Higher concentration of simazine inhibited the uptake of Fe by corn plants, whereas the **Mn** absorption was increased. Simazine @ 0.625 kg ai/ha. resulted in the accumulation of Cu in corn seeds.

സംഗ്രഹം

സിമാസിൻ എന്ന മരുന്ന വിതച്ച ഒരു ദിവസം കഴിഞ്ഞു മണ്ണിൽ തളിച്ചാൽ 'മക്ക ചോള'ത്തിന്റെ മണികളിൽ കൂടുതൽ നൈട്രജനും ഫോസ്ഫറസും കാണുന്നതായും ഇലയിൽ ഫോസ്ഫറസ് കൂടുന്നതായും കണ്ടു. പൊട്ടാസിയത്തിന്റെ അളവിനെ അതു ബാധിച്ചില്ല. ചെടികളിൽ ഇരുമ്പിന്റെ അംശം കുറയുന്നതായും, മാൻഗനീസ് കൂടുന്നതായും കണ്ടു. മണികളിൽ ചെമ്പിന്റെ അളവും കൂടികണ്ടു.

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