Abstracts of Ph.D. Thesis

Effect of Weed Control Methods and Nitrogen Levels on Wheat (*Triticum aestivum* L.) and their Residual Effect on Succeeding Summer Green Gram Crop

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Field experiments were conducted on a vertisol oil of Agricultural College Farm, Navsari (Gujarat) uring *rabi* and summer seasons of the years 986-87 and 1987-88, for studying the effect of ifferent weed control methods and levels of itrogen on wheat var. GW-120 (*Triticum stivum* L.) and their residual effect on succeeding rop of green garm.

The study involved six weed control treatments iz., unweeded control, two hand weedings, pplication of isoproturon at 1.0 kg/ha, endimethalin at 1.0 kg/ha, anilofos at 0.4 kg/ha ll pre-emergence) and fluchloralin at 1.0 kg/ha 10 DAS) in main plot and four levels of nitrogen .e., 60, 90, 120 and 150 kg N/ha in sub plot reatments replicated four times in a split plot lesign. The experimental soil was clayey in texture, ow in total nitrogen, medium in available hosphorus and fairly rich in available potash.

Yields of grain and as well as all the growth and eld attributing characters were significantly ffected due to different weed control methods and itrogen levels. Application of fluchloralin tended to ive highest yields of grain (3716 kg/ha) and straw 5654 kg/ha), although comparable yields were tained with pendimethalin and two hand weeding atments due to effective control of weed pulation and weed biomass. The herbicide uron exhibited phytotxicity on wheat plants during 14-24 DAS only. Similarly, all the growth and yield attributes as well as grain and straw yields of wheat were increased with increase in nitrogen application rate upto 150 kg/ha, eventhough 120 kg N/ha recorded statistically similar values for several characters. Dry weight of weeds was also markedly increased upto highest level of nitrogen.

The chemical analysis of grain and straw of wheat samples showed the highest uptake of nutrients (N, P_2O_5 and K_2O) in fluchloralin treated plots, while unweeded crop plants showed the lowest uptake. The removal of nutrients through weeds were lowest in two hand weeding treatment. The removal of nutrients by crop and weeds were also significantly increased with increase in level of nitrogen upto 150 kg/ha.

All the weed control methods and increased rate of nitrogen improved the grain quality of wheat in terms of protein content and protein yield. The higher protein content and protein yield was obtained with two hand weedings and application of 120 and 150 kg N ha^{-1}. Herbicides pendimethalin and fluchloralin also improved the protein content of wheat.

The highest net economic returns of Rs. 5377/ha was obtained with fluchloralin, followed by pendimethalin (Rs. 4775) and two hand weeding (Rs. 4624) treatments. The respective net returns per rupee invested were 1.13, 0.99 and 0.95 rupee. The economic net returns with 150 and 120 kg N ha^{-1} were Rs. 5314 and Rs. 5157 ha^{-1}, respectively with equal (Rs. 1.08) net returns per rupee invested.

The weed control treatments as well as nitrogen applied to preceding wheat crop did not leave any residue in the soil to effect the succeeding green gram crop adversely or favourably.

Based on the experimental results from data of two years, it can be concluded that application of 120 kg N/ha and fluchloralin at 1.0 kg/ha at 10 DAS is worth adopting as it gave better yields and highest economic returns with efficient control of weeds.

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