

Dissertation :

Response of Sugarcane *Saccharum officinarum* L. and companion weeds to plant growth regulators and herbicides

Abstract

Four experiments were conducted in the farm of the General Company for Sugar in Missan during 2001 and 2002 to investigate the effects of some plant growth regulators ,herbicides and their interaction on sugarcane *Saccharum officinarum* L. growth , yield and quality component of sugar and control companion weeds. In the first experiment treatments included application at early tillering stage different concentrations of growth regulators, ethephon ,GA3, daminozide , mepiquat chloride , fluazifop –butyl , 2,4-D, mefluidide and glyphosate. Same treatments were used in the second experiment but the growth regulators were applied at the early ripening stage .To control weeds or inhibit their growth by herbicide third experiment was carried out using bentazon , paraquat , fluazifop-butyl , glyphosate , and bentazon M .The results obtained from three experiments showed good performance of some growth regulator and herbicides which could be used in the fourth experiment to study the biological interaction effects of these chemicals on weed control and sugarcane yields. Complete Randomized Block Design were used with the three experiment each with three replications, whereas split plot design was used in fourth experiment with three replications . Herbicides glyphosate , fluazifop-butyl , paraquat , bentazon , Chevalier were regarded main (plot) treatments and growth regulators ethephon , mefluidide , glyphosate , 2,4-D , GA3 as sub (plot) treatments . The results of the present studies showed that :

- 1- Performance of different growth regulators varies with their concentration and time of application 200mg/L mefluidide or 2000 mg/L ethephon applied at early sugarcane tillering stage caused significant decreases in the heights but significant increases the number of tillers, stem diameter , the number of milling stems , total stems yield and sugar yield .Application of 400 mg/L GA3 or 100mg/L glyphosate or 100 mg /L 2,4-D increased the plant heights but reducing the number of tillers , stem diameter , total stems yield and yield of sugar .

- 2- Application of 200mg/L mefluidide or 2000 mg/L ethephon at early sugarcane ripening stage reduced the plants heights, stems diameter , the number of milling stems . juice purity and yield of sugar However application of 400mg/L GA₃ or 100mg/L glyphosate or 100 mg/L 2,4-D increased plant heights ,stems yield and sugar yield .
- 3- Application of herbicides such as paraquat or glyphosate or fluazifop – butyl led to lowest weed densities which were 35.6 , 48.6 , and 59.3 plant/m² respectively and achieved greater percentage of weed control represented 58 , 42.7 and 30.1 % respectively caused increased stem yield and sugar yield .
- 4- Results obtained from biological interactions study showed that application of mefluidide with glyphosate herbicide stimulated sensitivity of weeds plants to the herbicide . In this treatment lowest weeds density was recorded (13.0 plants/m²) and led to the greater percentage of weed control (84%) as compared with the application of herbicide alone which recorded weeds density (44.3 plant/m²) and percentage of weed control (45.4%). Similarly this treatment achieved greater stem yields (58.0 ton/ha) which represented (47.7%) increases as compared with control treatment or mefluidide alone (46.07 ton/ha) or herbicide alone (39.17 ton/ha) . However this interaction treatment was not differ significantly with the interaction treatment of paraquat with mefluidide or interaction treatment of ethephon with glyphosate . Moreover ,the interaction treatment of GA₃ with glyphosate caused great yield of sugar (6.18 ton/ha) which represented 68.8 % increases in sugar yield . However this interaction treatment showed no significant differences with interaction treatment of GA₃ with paraquat (5.84 ton/ha) or with fluazifop-butyl (5.69 ton/ha) . Similarly this interaction treatment were greater effects then application of glyphosate (4.3 ton/ha) or fluazifop-butyl (4.6 ton/ha) or paraquat (4.3 ton/ha) a lone in sugar yield respectively .