

Studies on chemical defoliation in cotton under egyptian conditions

Fardous Badr Abdel-Razik

SUMMARYSTUDIES ON CHEMICAL DEFOLIATION IN COTTON UNDER EGYPTIAN CONDITIONStwo field experiments were carried out at Bahtim Agricultural Research Station during 1986 and 1987 seasons. The aim of the present study was to investigate the effect of three defoliants , applied at three dates and three con-centrations on yield and fiber properties of Giza 75 cotton cultivar . Chemical defoliants were : DROPp at rates of 30 , 45 and 60 g./fed., Harvade at 500 , 750 and 1000 cm³/fed and Gramaxon at 150 , 200 and 250 cm³/fed. in addition to a control treatment . Application dates were 135 , 150 and 165 days from planting , which are considered as early , medium and late dates respectively . The experimental design was split - split plot with four replications .Defoliation dates were arranged at random in the main plots , while the chemical defoliants were distributed in the main plots, while the chemical defoliants were distributed in the sub-plots and the concentrations of defoliants were assigned in the sub- sub-plots .The results could be summarized as follows :(1) Early defoliation reduced number of green leaves/plant compared with the late defoliation dates with significant differences in the first season .DROPp was superior as a cotton defoliant concerning its effect in reducing number of leaves/plant, and Gramaxon was inferior in this respect, whereas , Harvade was in between .Increasing the concentration of defoliants significantly increased defoliation of cotton leaves .All interactions between the three experimental factors had significant effects on number of green leaves/ plant . The best defoliation efficiency was recorded by early application of DROPp at 30 gm/fed.(2)Early defoliation significantly reduced number of open bolls/plant by 15.21 % compared with late date .DROPp was superior to harvade and Gramaxon in affecting number of open bolls/plant , and the three defoliants were superior to the untreated check.The medium rate of concentration favourably affected number of open bolls/plant compared with low and high concentrations .All interactions between the three experimental factors had significant effects on number of open bolls/ plant . The highest number of open bolls/plant was produced by late application of the medium concentration of DROPp.(3).Delaying defoliation significantly increased number of infested bolls / plant . Defoliants application significantly reduced number of infested bolls/plant . Applying DROPp , Harvade and Gramaxon reduced number of infested bolls/plant by 30 , 26.7 and 25.3% in the first season , being 32.4, 28.1 and 26.6 % in the second season compared with undefoliated plants respectively .Concentration of defoliants did not significantly affect the number of infested bolls/plant . A significant effect for the interactions between date of defoliation (A) and type of defoliant (B) on number of infested bolls was detected .(4)Medium date of defoliation after 150 days from planting..was better than both early and late ones increasing boll weight .Type of defoliant had no significant effect on boll weight in the two successive seasons . whereas, the high and medium rates were superior to the low rate in increasing boll weight in one season only .Boll weight was significantly affected by the interactions between defoliation type (B) and its concentration (C) in the second season only .(5)Seed cotton yield/plant was increased by applying defoliants after 150 days from planting , which outyielded both early (135 days) and late (165 days) dates by about 5 , 6 % and 22 , 33 % in the first and second season , respectively .DROPp was superior to Harvade and Gramaxon as a cotton defoliant in increasing seed cotton yield/plant. The three defoliants were superior to the untreated check in affecting seed cotton yield/plant .Medium and high concentrations were superior to low

concentration in increasing seed cotton yield/plant. All effect/ of the interactions between the three factors significantly affected seed cotton yield/plant. The highest seed cotton yield was obtained by DROPp applied at medium date and medium concentration in the first season, and at high concentration in the second one. (6) Lint percentage was not significantly affected by defoliation date. Gramaxon application reduced lint percentage, whereas DROPp and Harvade showed no negative effect on this character. Concentration of defoliants had no effect on lint percentage. The interactions between defoliation date (A) and defoliant type (B), type (B) and concentration of defoliant (C) as well as the second order inter-action (AxBxC) significantly affected lint percentage. The highest lint % was produced by early application of Harvade at low concentration. (7) Late defoliation was significantly superior to medium and early dates concerning its effect on lint index. DROPp, Harvade and Gramaxon application reduced lint index compared with the untreated check. Concentration of the three used defoliants had no significant effect on lint index. Interaction between date of defoliation (A) and type of defoliants (B), type (B) and concentration of defoliant (C) and the second order interaction significantly affected lint index. The highest lint index was obtained by the undefoliated treatment and the lowest index was given by early application of Gramaxon at the low concentration. (8) Late defoliation (. after 165 days) increased seed index compared with medium and early dates. Using any of the three defoliants significantly reduced seed index in both seasons. The three defoliants could be arranged in a descending order according to their harmful effect on seed index as follows : DROPp, Gramaxon and Harvade. Seed index was not significantly affected by concentration of defoliants. Interaction between defoliation date (A) and type of defoliant (B) was significant on seed index in both season. The highest seed index was obtained by undefoliated cotton plants and the lowest index was recorded by the early application of Gramaxon. (9) Seed cotton yield/fed. was significantly affected by defoliation dates. Medium date of defoliation outyielded both early and late dates by 23.9 and 5.0 % in first season and by 37.3 and 3.3 % in the second season, respectively. DROPp, Harvade and Gramaxon application significantly increased seed cotton yield by about 19 and 21%, 14 and 17 % and 12 and 14 % in the first and second season, respectively. Medium concentration of chemical defoliants is recommended whereas the lower level was less effective as a cotton defoliant. All effects of the interactions between the three experimental factors on seed cotton yield/fed. were significant. The best result was obtained by DROPp applied at medium date and medium concentration. (10) Percentage of oil in cotton seed was not significantly affected by defoliation date as well as concentration of defoliants. DROPp, Harvade and Gramaxon application reduced oil percentage by 0.5 and 0.7 %, 0.5 and 0.6 % and 0.4 and 0.5 respectively, compared with undefoliated cotton plants. All interactions between the three factors under study on this trait were not significant. (11) Early defoliation reduced 2.5 % S.L. compared with medium and late dates. In general, the three defoliants significantly increased 2.5 7. S.L. compared with undefoliated cotton plants. On the other hand, defoliant concentration did not significantly affect 2.5 % S.L. Date of defoliation (A) and type of defoliant (B) as well as date of defoliation (A) and concentration of defoliant (C) interactions significantly affected 2.5 % S.L. (t2) Medium and late dates of defoliation were superior to early date concerning their effect on 50 % S.L. A slight increase in 50 % S.L. was observed due to defoliation in the first season, whereas in the second season defoliants reduced this trait. Concentration of defoliant did not significantly affect 50 % S.L. In 1987 season, the interaction between application date (A) and defoliant type (B) as well as type of defoliant (B) and its concentration (C) significantly affected 50 % S.L. (13) Length uniformity ratio was favourably affected by medium as well as late dates of defoliation with significant difference in 1987 season. DROPp, Harvade and Gramaxon application reduced length uniformity ratio by 4.3, 3.9 and 3.9 %, respectively compared with undefoliated cotton plants. On the other hand, concentration of defoliants did not significantly affect length uniformity ratio. Interactions between date of defoliation (A) and type of defoliant (B) as well as type (B) and concentration of defoliant (C) had a significant effect on length uniformity ratio in 1987 season only. (14) Fiber elongation was significantly affected by date of defoliation in the first season. Medium as well as late dates of defoliation were superior to early defoliation in affecting fiber elongation. Defoliants application increased fiber elongation in 1966 season only. DROPp, Harvade and Gramaxon application increased fiber elongation by 3.3, 3.1 and 3.3 %, respectively,

compared with the control. whereas , fiber elongation was not affected by the concentration of defoliants .Interaction between defoliation date (A) and defoliants type (B) as well as date of defoliation (A) and concentration of defoliants (C) showed a significant effect on fiber elongation in the second season only .(15) Defoliation date showed a significant effect of floating fiber index in both seasons . Early defoliation increased floating fiber index by 13.5 and 48.5 % in the first season , and by 20.6 and 25.5 % in the second one compared with medium and late date , respectively .Defoliants increased floating fiber index . The greatest increase in floating fiber index was recorded by Gramaxon . All differences reached the significant level in the first season only. Concentration of defoliants had no significant effect on floating fiber index. Interaction between type (h) and concentration of defoliant (C) significantly affected floating fiber index in 1987 season .(16) Early defoliation , after 135 days from planting, reduced fiber strength . It is advisable to undertake defoliation after 150 or 160 days as far as fiber strength is concerned. DROPp , Harvade and Gramaxon application increased fiber strength by. 2.8 , 2.5 and 4.7 % , respectively compared with undefoliated cotton in 1986 season .Fiber strength significantly increased as the rate of defoliants increased in the second season .Fiber strength was significantly affected by the interaction between defoliation date (A) and type of defoliant (B) in 1986 season , whereas the second order interaction had significant effect on this trait in 1987 season . The highest fiber strength was obtained by DROPp at high concentration applied after 150 days from planting .(17) Early defoliation caused injuries to yarn strength compared with medium and late dates . Applying DROPp, Harvade and Gramaxon significantly increased yarn strength by 5.0 and 5.2 , 5.1 and 5.7 in the first season , and 5.0 and 5.4 % in the second season , respectively compared with untreated cotton .Concentration did not significantly affect yarn strength .The interaction between date of defoliation (A) and type of defoliants (B) significantly affected yarn strength .(18) Early defoliation decreased micronaire value by 3.2 and 3.6 % and 4.3 and 4.6 % , compared with medium and late defoliation dates , in the first and second season , respectively In the first season, DROPp , Harvade and Gramaxon application reduced micronaire value by 8.0 , 6.6 and 7.0 % , respectively , compared with the undefoliated treatment , indicating a favourable effect on fiber fineness . Concentration had no significant effect on fiber fineness The interaction between defoliation date (A) and defoliant type (B) showed a significant effect on micronaire value .