Effect of certain antimoulting compous cotton pests

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The study presented in this work was carried out under laboratory conditions to find out the effects of two chitin synthesis inhibitors, flufenoxuron and lufenuron, on the larvae of Spodoptera littoralis and Agrotis ipsilon and also on the pupae and adults resulted from the treated larvae which were fed in their, 2nd, 4th and 6th instars, on castor-bean leaves treated using dipping technique on 4 concentrations (12.5, 6.25, 3.1 and 1.5 ppm) of the mentioned compounds. The obtained results could be summarized as follows:I. Direct toxicity on S. littoralis and A. ipsilon:Mortality percentages among the treated larvae increased by increasing the applied concentration of Chitin Synthesis Inhibitors and by treatment of larvae at their earlier instar. Highest mortality percentages were recorded after treatment of the 2nd instar larvae with the assayed compounds (75& 82.5% among S. littoralis larvae and 80 & 77.5% for A. ipsilon after treatment by flufenoxuron and lufenuron treatments, respectively). The concentration mortality lines indicated that the LC50., among S. littoralis larvae were 0.059, 0.113 and 2.944 ppm for flufenoxuron treatments and 0.067, 0.025 and 2.435 for lufenuron treatments to 2nd, 4th and 6th instar larvae, respectively. While, for A. ipsilon, those were 0.0062, 0.919 and 13.608 ppmfor flufenoxuron and 0.277, 0.035 and 38.492 ppm for lufenuron treatments, respectively. It was generally observed that flufenoxuron was more toxic to the 2”d instar larvae of S. littoralis and on the 2”d & 6`11 instar larvae A. ipsilon than lufenuron.II. Biological activity of chitin synthesis inhibitors: II.1.Malformations among treated larvae and subsequent stages:Some of the surviving S. littoralis and A. ipsilon larvae, after treatments, showed different kinds of malformations. Malformed S. littoralis larvae showed either black pigmentations on cuticle or its cuticle became shrinkaged. While, few appeared much larger in size than the normal 6th instar larvae so that those were called giant larvae. Different types of malformations appeared among A. ipsilon larvae, such as incision between thorax and abdomen with bulged abdomen, shrinkage and mummified appearance, or the head capsule attached to the dorsal cuticle of prothorax, while few showed giant larvae. In all cases, the deformed larvae were unable to complete metamorphosis. At the time of pupation of both insect species, some larval-pupal intermediates were detected, while in other cases, deformed pupae appeared more solid and mummified. Also, some malformed adults of both species were detected among those developed from treated larvae by either of flufenoxuron or110lufenuron. Deformed adults had shrinkaged wings, or in other cases appeared abnormal in shape.Among all individuals from the three concerned stages after treatments, the percentages of malformations ranged from 0-52.5, 5-50 and 0-33.3% from S. littoralis larvae, pupae and adults, opposed to 5-40, 2.5-35 and 0-35.7%, respectively in case of treatment of larvae from different instars by the two assayed chitin synthesis inhibitors.Comparing the efficiency of flufenoxuron with that of lufenuron larval treatments in causing deformations among larvae, pupae and adults of S. littoralis and A. ipsilon, it was clear that the efficiency varied between the two compounds depending on the treated larval instar, the applied concentration and the insect species. But, it could be generally stated from the obtained data that flufenoxuron was more effective in causing deformations among S. littoralis individuals than lufenuron. While, the latter compound may be, generally, considered as more effective than the former one on A. ipsilon.II.2.Effect on larval duration:The larval period was estimated from the time of treatment until pupation. Treatments of S. littoralis larvae in their 2” instar by feeding on castor-bean leaves treated

by either of 4 concentrations of flufenoxuron or lufenuron, the effect on larval period was found as prolongation or shortening of this period111than that recorded from the control larvae, but generally the effect on this period was insignificant. On the contrary, the 4th instar larval treatments, with all concentrations of flufenoxuron, caused prolongations in the larval period (7.49-9 days) than control (7.17 days), while the effect of lufenuron treatments on this period (8.03-9.06 days) was statistically insignificant compared to that of the control larvae (8.6 days). As for the S. littoralis 6th instar larval treatments, all flufenoxuron treatments caused prolongations in the larval period (6.49-7.07 days) than control (6.25 days). While, the effects of lufenuron treatment on 6th instar larval duration (5.81-6.84 days) compared to that of control larvae (6 days) were statistically insignificant.As for the effect of A. ipsilon larval treatments on larval duration, the obtained data indicated that the 2nd instar larval treatments by different concentrations of chitin synthesis inhibitors had insignificant effects on the larval period after treatment (9.75-10.52 days after flufenoxuron treatments opposed to 10.05 days for control larvae, and 11.64-12.2 days opposed to 12.25 days for lufenuron treatments). The same trend of insignificant effect on larval duration occurred after 6th instar larval treatments (6.08-6.62 days opposed to 6.71 days and 6.31-7.08 days opposed to 6.4 days after flufenoxuron and lufenuron treatments, respectively). While, on the contrary, treatments of A. ipsilon larvae in their 4th instar caused prolongations in the larval112period. These prolongations were insignificant in case of flufenoxuron (8.33-8.63 days opposed to 7.7 days for control) and significant in case of lufenuron treatments (9.17-10.04 days) compared to the period control larvae (8.75 days).II.3.Effect on pupal duration:The pupal period was estimated among pupae obtained from the surviving larvae after treatments by flufenoxuron and lufenuron. Significant shortening in pupal period than control occurred after S. littoralis 2nd instar larval treatments by flufenoxuron at 6.25, 3.1 and 1.5 ppm. While, insignificant prolongations in pupal duration (13.1-13.7 days) occurred from lufenuron treatments than control (12.6 days). Treatments of 4th instar larvae by flufenoxuron resulted pupal periods of 12.8-13.3 days which were significantly shorter than control (13.7 days), and the same trend was recorded from lufenuron treatments (13.7-14.23 days from treatments opposed to 14.9 days from control pupae). The same trend of shortening, significantly, the pupal period was also recorded after 6th instar larval treatments by flufenoxuron or lufenuron (10.8-11.6 days opposed to 11.9 days from control and 11.7-12.4 days opposed to 12.6 days from control, respectively).Concerning the effects of A. ipsilon larval treatments on durations of subsequent pupae, the obtained data indicated that all concentrations of flufenoxuron and lufenuron had no significant113effect in prolongation or shortening the pupal period than control. The only significant effect occurred when the 4th instar larvae were treated by lufenuron as all concentrations caused prolongation of pupal period than control (13.8 days), this effect was significant by using the concentrations 6.25, 3.1 and 1.5 ppm (14.6, 14.5 and 14.3 days, respectively).II.4.Effect on pupal weight:The S. littoralis and A. ipsilon normal pupae which were obtained in laboratory, by rearing the larvae after 2nd, 4th and 6th instar larval treatments by different concentrations of flufenoxuron and lufenuron, were weighed to find out the effect of larval treatments on the weight of subsequent pupae. Data from all treatments to S. littoralis and A. ipsilon larvae indicated that larval treatments caused reductions in the weights of subsequent pupae, and the reduction rate was always proportional to the concentration in which the castor-bean leaves were dipped. from all treatments, the lightest weights of pupae were detected after larval treatments by the highest concentration (12.5 ppm) of either of the two chitin synthesis inhibitors under investigation (286-298 mg/S. littoralis pupa and 262-309 mg/A. ipsilon pupa after larval treatments by flufenoxuron opposed to 300-312 mg/S. littoralis pupa and 281-321 mg/A. ipsilon pupa after treatments by lufenuron). While, the recorded weight of a114control pupa was 310-361 and 300-369 mg/pupa of S. littoralis and A. ipsilon, respectively.II.5.Effect on pupation and adults' emergence:Percentages of normal pupation from treated larvae and subsequently the percentages of adults' emergence were estimated. All larval treatments by either of flufenoxuron or lufenuron caused high reductions in the percentages of formation of normal pupae. Generally, negative relationship was detected between the larval instar at the time of treatment & the applied concentration in relation to the percentage of normally formed pupae. When larvae were treated by flufenoxuron or lufenuron, the lowest percentages of normal pupation (25 & 17.5% from S. littoralis larvae and 20&22.5% from A. ipsilon treated larvae) were

obtained by treatment of larvae in their earliest (211d) instar by the highest concentration (12.5 ppm) of flufenoxuron or lufenuron, respectively, while the percentages of normal pupation from untreated larvae ranged from 92.5-100%. Results indicated also that all normal pupae that developed from treated and control larvae transferred to adults indicating 100% emergence.