Studies on the environmental toxicity effects of certain insecticides on cassida vittata (Vill.)

Ahmed Goudah Mohamed Youssef

5.2- Physiological studies : To study the envir§mMlikluMticYon the tested pesticides, either as parent or/and as residues resulted from degradation, both initial lidabi4gid76fiatYkilf4vks ii,t4it?RiterefTirfRighuggdM.41-tgifig Otdviigag4sila(§f8AVal.4)cific intervals, i.e., 0 - 1st day, 7th - daxtoikh bedt* diriss %eh(’ 2vlittata210’411 akrottlffferWhe iillu*sovuetida46s etofand iticisitoxe2idaslitid italklitteAvpstcoligggetif itiedieivrEgyptiotiza aatiogl isolleilv§/ MIA:Maio; ittditigettatAkfficiii dotrtizeteeldeavaad subsequently losses in sugar production.pawipInftiudtalainxidoltagfind Gsiftthiseindrudgaetitaidoxiaity tgrilotsattsi/a34:bfaihedidata norlitiklib(iratatinialixedrailiolfmost.:F-1-firtkirQiftgitiiliois3Idiled :toxicity of different pesticides on theacVaTittatetue carried out using leaf-dipping technique for glortilangotattf4ty index spectrum toward eggs and adults of C. vittata collectAcil folisectit*It’s bettilfitidshivArTrentouncediiniiirdctexittit3p(iftett tOtItrOci)Togmloptvap9t1pc*/en (55 %), azadirachtin (50 %),bex*Ifelliiir)8Pitt edre.c01109 `evgAkcilm Et-To QfiretefiftiRk aduttly ccrbAtAfaiifkUs d’es StrteatgelAggifeit&MsfiMschilzerpinies61-NvgailAealkl3R1OliP’61followed by 3 days feeding onimtnrbtrAiltV`iRlex ratios (T.I.) values revealed that abamectin andiffirmfagfemsAlAteyd:relatively high toxicity index levels (63.86 and61 74M, 11414qt are Weliddlittfakileitkegigrnthe tWilStkkiltfaefg,Ivitttclik41. car8A9Mrdicr(ltb0 19WgritivOft1Etif404 1(1446 VOs ivrtate wttiagst(1107.15 ml/cf.)--sit°46e 2nd testing interval while the bioresidual toxicity ranged betvT4n trNi*tg .34%1RdcltV0 VatfNaal4chliVctivi’lrlf. 344//uftEd 4th itle4ifniCilit61141s944ptiglIWas the most toxic insecticides (3.58),while the hexaflumuron was the least toxic (148.54).erfitkI (.4.f1.)cWItAqii reialiedckliat aliamagiereind viggfilmeakweimettiledemitiitta thdritnieyels (54.07 anda-E4aTinaWyjiniittatikinacththiiiibpafolle carbosulfan (T.I. = 100). H°Meri•_••.• -_• _ / 11 4 de 1-11. I •C.1imiTafie,741-660%and carbosulfan and profenofos at the high rate exhibited the highest accumulated latent adult mortality.b-Effect on adult longevity :The adult longevity was remarkably increased recording percent increase ranged 0.66-59.12 %. However, the highest increase was associated with both rates of pyriproxyfen treatments.c-Effect on adult weight :Mean adult weight was considerably reduced at the four testing intervals compared with control. The highest reduction in mean adult weight was recorded for profenofos at 750 miffed. and carbosulfan at 800 gm/fed.d-Effect on adult fecundity :The adult fecundity was remarkably reduced in all tested intervals and reduction was highly pronounced in the 1st testing interval (0-1 day) recording 55.76-89.42 %, 45.36-76.09 %, 24.27-79.61 %, and 1.96-71.07 % reduction in adult fecundity during 1st, 2nd, 3rd and 4th testing intervals, respectively. Pyriproxyfen, lufenuron and methoxyfenozide exhibited the highest reduction in adult fecundity during most testing intervals where almostly no emerged adults were recorded.e-Effect on eggs viability :The viability of eggs deposited by adults emerged in treatment was remarkably affected recording inhibition in eggs hatch percentages reached 45.2-98.4 %. The maximum latent effect on egg hatch was demonstrated by the highest eggs hatch inhibition in pyriproxyfen than in all tested.f-Effect on larval mortality :The latent effect un larval mortality was remarkably low and was within the treatments and the control. The highest mean larval mortalityin 1st testing interval was recorded for pyriproxyfen, 2nd testing and 3rd testing was recorded for methoxyfenozide while at the 4th testing was recorded for spinosad.g-Effect on larval duration :The larval duration was elongated remarkably. However, the highest increase was

associated with pyriproxyfen treatments particularly at the higher rate.h-Effect on pupation and pupal malformation :Remarkable reduction in pupation rate in comparison with control was recorded for all tested insecticides, and high abnormality percent in the resulted pupae. The highest reduction in pupation rate and abnormality percent was recorded in pyriproxyfen and lufenuron.i-Effect on pupal mortality :The effect on pupal mortality was remarkably low and the differences between treatments and control were relatively low. The highest mean pupal mortality was (3-14 %) versus (1-4 %) for the control treatment.j-Effect on pupal duration :Pupal duration was considerably reduced in all insecticidal treatments (7.24-25.0 %), the highest reduction percent was recorded in pyriproxyfen treatments.3- Effect of different pesticides on the consumption, digestion and utilization of food in adult stage of C. vittata :a- Antifeeding activity (A.A.) :Azadirachtin at both concentrations tested revealed significantly the highest mean antifeeding activity where abamectin exhibited significantly the least antifeeding activity.b- Food consumption (C.W.)•All insecticides tested during all testing intervals except pyriproxyfen at the 2nd testing interval resulted in remarkable reduction in consumed food ranged between -2.94 and -42.85 %.•The reduction based on overall mean consumed food was in general positively associated in most treatments with the concentration level, regardless of tested insecticide.c- Consumption index (C.I.) :•All insecticides except pyriproxyfen resulted in remarkable reduction in CI values ranged between -14.08 % and -40.31 % for the 1st interval, -13.11 % and -33.21 % for the 2nd interval, -3.07 % and -33.79 % for the 3rd interval and -4.95 % and -33.79 % for the 4th interval, whereas pyriproxyfen treatments caused increase in CI ranged between +3.49 % and +4.47 % for the 2nd interval.•Based on the overall mean CI values during all testing intervals, CI values of all treatments were statistically similar and were significantly lower than control.d- Growth rate (G.R.) :All treatments resulted in remarkable reduction in GR values, reached its maximum at 2nd testing interval (0-1 day) then the reduction percent decreased gradually with progress in time after spraying till the 4th testing interval (21-22 day) recording the least percent reduction in GR values.•Comparison on the basis of the overall mean growth rate (GR) revealed that profenofos and hexaflumuron at the low rate exhibited GR statistically similar to control and both were significantly higher than other treatments..e--Approximate digestability (A.D.) :Based on the overall mean AD during all testing intervals, it was obvious that carbosulfan treatments increased significantly theAD % (97.14-99.42 %) whereas other treatments, except lufenuron, including control came significantly next. On contrary, lufenuron exhibited significantly the least AD % (95.42 %).f- Efficiency of conversion of ingested food (E.C.I.) :•Comparison on the basis of the overall mean ECI values within different testing intervals indicate that ECI values in all treatments except methoxyfenozide were slightly lower and insignificant when compared with control.•Lufenuron at the high rate resulted in the least ECI values in adult of C. vittata.g- Efficiency of conversion of digested food (E.C.D.) :•Comparison in overall mean basis indicated that adult of C. vittata performed almostly similar and all treatment resulted in lower and insignificantly variations in ECD values.•The data, in general, indicate that ECD was directly proportional to the ECI and inversely proportional to AD.•The highest ECD value was recorded for methoxyfenozide at the high rate whereas the least ECD values were recorded for lufenuron at the high rate (40 ml/fed.).5.3- Biochemical studies :The biochemical studies were performed to evaluate the effects of sublethal concentration (LC25) of the tested insecticides on some enzyme activity of C. vittata. The results could be summarized as follows :a- Esterases (a-E and (3-E) :•In normal state, the adults of C. vittata were characterized by higher titer of non-specific esterases to the control.•The data revealed also that adult exhibited an increase in their a-E and 13-E activity after 24 hours.•The adult collected after 48 hours showed change in a-E and 13-E activity exhibiting remarkable decrease.b-Phosphatases (AcP & AlkP) :•The adult collected after 24 hours showed change in AcP activity exhibiting remarkable decrease for most tested insecticides less than the control. whereas the change in Alk.P activity in all tested insecticides was manifested as increase than the control.•The sublethal concentration (LC25) of the tested insecticides caused a dramatic decrease in the level of both AcP and AlkP activities in most tested insecticides after 48 hours.c- Carbohydrates hydrolyzing enzymes :•The data obtained from amylase enzyme revealed remarkable increase in activity much greater than the control after 24 hours. On contrary, activity of invertase enzyme was much less than the control after 24 hours.•The data obtained for activity of amylase enzyme was

much less than the control after 48 hours. But invertase enzyme activity was much greater than the control after 48 hours.d- Total protein :•Total protein was hours.•Total protein was hours.increased in most tested insecticides after 24 decreased in most tested insecticides after 48