Studies on the most important cucumber pests in the open field and suitable control programs

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Cucumber is one of the most important cucurbitaceous plants and cultivated in Egypt in the open field and under greenhouses. Also, its cultivated area was increased during the last years especially in new reclaimed areas for local consumption and exportation to the foreign markets. The present study was carried out during 2001 and 2002 seasons at the experimental farm of the Faculty of Agriculture at Moshtohor to obtain the best control programs for the important sap-sucking pests infesting cucumber plants; Thrips tabaci, aphids (mainly A. gossypii & M persicae), Bentisia tabaci (eggs, nymphs & adults) and eggs & moving stages of Tertanychus urticae. Results may be summarized as follows:I- Effect of some cucumber varieties, planting dates and their interaction on the infestation rates of some sap-sucking pests and resultant yield:I.1: Pests' infestation rates to different cucumber varieties and resultant yield:The two seasons' data concerning infestation rates by the mentioned pests to each of seven cucumber varieties (Babylon, Al-Zaeim, El-Nems, Prince, Super-Delila, Thamin and Ivor) are as follows:I.1.A: Thrips tabaci:The highest infestation rate of T. tabaci (nymphs+ adults) was occurred on Ivor variety (48.9 individuals / leaf), followedby Prince variety (45.72 individuals / leaf). While the lowest infestation occurred on Babylon, followed by Al-Zaiem variety (25.80 and 26.29 individuals / leaf, respectively).I.1.B: Aphids (mainly A. gossypii and M. Persicae):Highest seasonal mean count of aphids was detected on leaves of El-Nems variety (16.07 individuals / leaf as two seasons' mean). While the varieties Babylon, Al-Zaeim Super-Delila and Prince had moderate rates of relative population density (9.56, 8.82, 7.24, 7.01 individuals / leaf, respectively). On the other hand the two varieties Thamin and Ivor manifested the lowest rates of infestation by aphids, (5.27 and 2.61 individuals / leaf, respectively).1.1.C: Bemisia tabaci:a:Eggs:The seven cucumber varieties could be arranged discendingly with respect to their susceptibility to infestation by B. tabaci eggs to: Thamin (15.63) > Super-Delila (14.79) > Prince (12.34) > Al-Zaeim (12.16) > El-Nems (10.65) > Babylon (9.48) > Ivor (7.94 eggs / in2. This indicating the highest infestation rate on leaves of Thamin and the lowest rate on Ivor variety.b:Nymphs:Also Super-Delila, Thamin and Prince varieties harboured higher infestation levels by B. tabaci nyniphs (9.41, 8.64 and 7.78 nymph / in2, respectively. While, El-Nems, Al-Zaiem, Babylon and Ivor varieties were infested by much fewernumbers of nymphs (4.89, 4.87, 4.68 and 4.34 nymphs /in2, respectively).c:Adults:Concerning, the overall means of the two seasons' counts of B. tabaci adults showed, nearly, the same trend of the infestation to the different varieties. Prince, Thamin and Super-Delila were infested by more adults, showing 9.28, 9.01 and 8.11 adults / leaf, respectively. While the lowest rates of infestation were 4.50 and 4.37 recorded for Babylon and Ivor, respectively.1.1. D: Tetranychus urticae:a:Eggs:Mean counts of T urticae eggs during the two seasons confirmed that the same varieties that suffered the high numbers of B. tabaci (eggs, nymphs and adults) suffered also from high infestation with eggs of T. urticae (17.38, 13.67 and 12.62 eggs / in2 for Thamin, Super-Delila and Prince,' respectively). Also, Ivor and Babylon varieties were the least infested, showing 4.85 and 6.10 eggs / in2, respectively.b:Movable stages:from two seasons, data of mean infestation rates by T. urticae moving stages to different cucumber varieties, Thamin and Prince varieties showed 14.92 and 12.70 individuals / in2 being highly infested. While, Al-Zaeim, Babylon and Ivor varieties were the least infested (5.23, 4.22 and 3.72 individuals / in2, respectively).I.1.E. Yield:Data concerning the yield of .cucumber fruits obtained from plots of

different varieties confirmed the negative relationship between infestation rates by the studied pests and the weight of fruits. Babylon variety which showed low infestation rates by most of the studied pests and stages gave the highest weight of cucumber fruits (13.95 Kg /plot), followed by Al-Zaeim variety which was moderately 'infested (9.99 Kg / plot). While Thamin and Super-Delila varieties which were infested with large numbers of these pests produced the lightest weight of fruits' yield, (6.40 and 6.93 Kg / plot, respectively).1.2: Effect of planting date on the rate of pests' infestation tocucumber plants and obtained yield:I.2.A Thrips tabaci :The results confirmed that the abundance of Thrips !abaci individuals increased significantly on cucumber plants as the planting date was delayed. The two seasons' mean rates of infestation (adults + nymphs) were 34.56, 37.42 and 53.08 individuals / leaf of plants that were sown on March, 151h andApril, 1st & -di%) respectively.1-2-B: Aphids (mainly A. gossypii and . persicae):In spite of the appearance of aphids with low numbers in both seasons especially in the 2nd season, 2002, the results showed that numbers of aphids increased by delaying the planting date. The mean number of aphids / leaf was 14.30 individuals on the cucumber plants sown in the 3"1 date (April, 15th), opposed to 3.89 and 1.82 individuals/ leaf of plants sown in the second and first date, respectively. The differences between these means were significant.I.2.-C:B. tabaci :a:Eggs:The same results obtained in cases of T. tabaci and aphids were confirmed for the population of B. tabaci eggs on cucumber plants during the two seasons' together. Plants from seeds sown on March, 15th and April, 1st & 15th harboured 9.25, 11.37 and 14.08 eggs / in2 for the three dates, respectively.b:Nymphs:The earliest planting date led to plants harboured the fewest mean number of B. tabaci nymphs (2.43 nymphs I in2).while, those of the latest date were the heaviest infested (10.26 nymphs / in2).c:adults:Early sowing was also correlated with plants showed the lowest infestation rate by B. tabaci adults (3.83 adults / leaf), opposed to 5.50 and 8.39 adults / leaf for plants grew after sowing in the second and third dates .I.2.D: Tetranychus urticae: a: Eggs:The results showed that the cucumber plants planted in the 3"I date harboured the largest number of eggs (15.97 eggs / in2). While, those cultivated during March, 15th showed the lowest mean infestation rate by T . urticae eggs (7.35 eggs / in2).b: Moving stages:Significant differences were observed between the mean numbers of T. urticae moving stages (larvae + nymphs +adults) counted on cucumber plants cultivated in the three different planting dates, March, 15th and 1st and 15th of April. The fewest mean of two seasons' (5.75 individuals / in2 of leaf) was obtained from cucumber plants of the earliest planting date. The population increased significantly on plants of the 3rd planting date (14.40 individuals / in2).I.2.E: YieldData confirmed that the final yield of cucumber fruits was negatively affected by the rate of infestation by the studied pests. Plants of earliest planting date that harboured the lowest counts of all the tested pests gave the heaviest yield (9.99 kg / plot). While, those of the 3rd date (April, 15th), which were infested with high rates of all pests gave only 4.68 kg/plot.1.3: Interaction effect of cucumber varieties and planting dates on the rate of infestation of some cucumber pests and resulted yield:I.3.A: T. tabaci:The combined effect of cucumber varieties with the three planting dates showed that, Ivor variety plants which resulted from sowing in the 3rd date suffered the highest infestation rates (79.06 individuals /leaf; two seasons' mean). On the contrary, Babylon variety planted in the 1st date was found infested by the lowest count of T. tabaci (24.91 individuals / leaf).I.3.B: AphidsThe seasons data indicated that the lowest population of aphids (0.85 individual / leaf), was counted on Ivor plants cultivated in March, 15th. While highest infestation occurred on El-Nems variety which was cultivated on April, 15th (34.38 individuals / leaf).I.3.C: B. tabaci:a:Eggs:Population of eggs of B. !abaci 1in2 reached to the lowest count on plants of Babylon and Ivor varieties, grew after sowing on March, 15th (6.91 and 6.95 eggs / in2, respectively). On the contrary, the two varieties Super-Delila and Thamin showed highest susceptibility, especially when sown on Apri1,15th; i.e., the latest planting date, showing 18.03 & 17.28 eggs / in2 , respectively.b:Nymphs:The lowest allover mean counts of the two seasons' for B. tabaci nymphs were recorded on cucumber plants of Ivor, Al-Zaeim and Babylon varieties cultivated on March, 15th being 1.90, 1.96 and 2.38 nymphs / in2, respectively. On the other extreme, Super-Delila, Thamin and Prince varieties planted on April, 15th suffered the heaviest infestation rate of nymphs, (15.26, 13.59 and 12.60 nymphs / in2, respectively).c:adults:Population abundance of B. tabaci adults took the same trend as that of immatures. Super-Delila, Thamin and Princeharboured also high counts of adults when cultivated in

the 3rd planting date (9.87, 10.89 and 11.26 adults / leaf, respectively). While, Ivor, Babylon and Al-Zaeim varieties were invaded by the smallest population (2.31, 2.45 and 3.56 adults / leaf when planted in March, 151h.I.3.D: T. urticae: a. Eggs:According to the overall mean counts of T urticae eggs of the two seasons' altogether, significant differences between the seven cucumber varieties sown in the three planting dates were calculated. Best results were obtained from Ivor and Babylon varieties sowed in the 1s1 planting date (4.72 and 5.04 eggs / in2, respectively). Highest populations of eggs (27.94, 24.03 and 20.26 eggs / 1112) were counted on leaves of Thamin, Super-Delila and Prince varieties planted in April, 15111, respectively.b: Mobile stages:The lowest overall mean infestation rate of movable stages of T. urticae (1.97 individuals / in2) occurred on leaves of Ivor plants of the 1st planting date, followed by Babylon and Al-Zaeim varieties (2.80 and 2.79 individuals / in2, respectively). While, the heaviest infestation of 27.00 individuals / in2 was observed on Thamin variety planted on April, 1511'.1.3.E: Yield:Negative con-elation between the rate of infestation to different varieties and weight of the resultant cucumber fruits'yield was clear. All varieties grew after sowing in the earliest date showed lower infestation rates and heavier fruits' yield. Babylon variety (that showed lowest infestation by pests) which was planted in the earliest planting date produced the heaviest weight of cucumber fruits' (15.73 kg / plot). Opposing to that, Ivor variety which was cultivated in the latest planting date (April, 15th) gave the lightest weight of fruits (3.40 kg / plot).Also, Prince, Thamin and Super-Delila varieties which showed high levels of infestation produced also small quantities of fruits when cultivated on April, 15th, (3.92, 4.13 and 4.43 kg / plot, respectively).1.4: Relation between phytochemical components of leaves from seven cucumber varieties and population density of certain pests:I.4.A: T. tahaci:Population abundance of T. tabaci stages increased on plants of different varieties during the flowering and fruiting stages. On the other hand, the calculated (r) values between the pests' population and phytochemical components of the cucumber leaves were negative in cases of total protein, non-reduced sugars and phosphorous and positive in cases of carbohydrates, reduced and total sugars and moisture.I.4.B: Aphids:More aphids infested cucumber plants during the fruiting stages, followed by flowering stage, while fewest numbers were on the seedling stage. Also, insignificant positive correlationcTIA/fA44 RV 240values were detected between aphids count and each of total protein and carbohydrates. While, the calculated (r) values confirmed negative insignificant correlation with the other tested components.I.4.C: B. tabaci: a.: Eggs:Population abundance of B. tabaci eggs on cucumber plants during three vegetation stages took the same trend as occurred in case of aphids. Eggs' abundance showed significantly positive correlation with the non-reducing and total sugars and insignificantly positive correlation with total protein & moisture content. While, negative correlation values were calculated in cases of carbohydrates, reduced sugars and phosphorous.b:Nymphs:Positive correlation values were calculated between the population of B. tabaci nymphs on leaves of the cucumber varieties during their vegetation stages and the leaf contents of total protein, reduced, non-reduced & total sugars and moisture content, these values were significant in cases non-reduced and total sugars. The correlation (r) values were negative in cases of carbohydrates and phosphorous.c:Adults:The relationship between the population abundance of B. tabaci adults on cucumber and the phytochemical components of leaves was positive and significant in case of moisture (r =.STIMAIARV I 2410.80) and insignificantly positive in cases of total protein, non- reduced and total sugars. While, in cases of carbohydrates, reduced sugars and phosphorous, a negative relationship wasdetected.I.4.D: T. urticae:a:Eggs:Data indicated that the T. urticae egg counts, on the cucumber leaves, increased when the leaves contents of non-reduced & total sugars and moisture increased, as the correlation values between them were positively significant. Positive insignificant values were calculated in cases of total protein and reduced sugars. While, the relationship was negative in cases of carbohydrates and phosphorous.b:Movable Stages:Moving stages of T urticae were of higher abundance on cucumber plants during the flowering stage. The population showed significantly positive relationship with total sugars and moisture contents, and insignificantly positive correlation with total protein, reduced & non-reduced sugars and phosphorous. At the same time, the correlation with carbohydrates was insignificantly.1.5.: Relation between anatomical characters of leaves of cucumber varieties and infestation by certain sap-sucking pests:This study was carried out to find out some other factors

which may be responsible for the rate of infestation to sevenvarieties with the tested pests during the three vegetation stages (seedling & flowering and fruiting), where the thickness of the leaf upper epidermis and palisade & spongy tissues were measured and the con-elation between these layers and the infestation rates were statistically calculated.I.5.A: Thrips tabaci:Insignificant negative (r) values were calculated between the mean counts of T tabaci individuals / leaf and the thickness of upper epidermis & palisade and spongy tissues (r = - 0.57, -0.34 and -0.59, respectively). This means that the varieties characterized by thicker layers were less susceptible to fillips infestation. Ivor variety which manifested thinner layers harboured highest mean population of T tabaci; (71.47 individuals / leaf).L5.B: Aphids:Positive insignificant (r) values were calculated between abundance of aphids on leaves in relation to thickness of the three different measured layers of leaves. The heaviest seasonal mean infestation rate (47.82 individuals / leaf) was recorded on El-Nems variety which was characterized by thicker three tested layers.I.5.C: B. tabaci: a: Nymphs:All (r) values calculated to find out the relationship between the B. tabaci nymphs population in relation to thickness of the leaf layers were insignificantly positive. Also, Ivor varietywhich was infested by small counts of B. tabaci nymphs had thinner measurements of the three layers.b: Adults:The calculated (r) values between B. tabaci adults' abundance and thickness of the three measured layers of leaf were 0.08, 0.71 and 0.19, being insignificantly positive. Thamin variety which had the thickest palisade and spongy tissues was infested with heavy population of B. tabaci adults (9.71 adults/leaf).I.5.D: T. urticae moving stages:Insignificantly negative relationship was calculated between the thickness of the upper epidermis and spongy tissue of leaf of the cucumber varieties in relation to abundance of T. urticae moving stages. While, this relation was insignificantly positive in case of the palisade tissue, as the corresponding values were - 0.17, - 0.07 and 0.59, respectively. In this direction, the leaves of the Thamin variety which had the thinner epidermis (11.88 microns) was found infested by the highest numbers of T urticae moving stags (32.90 individuals / in2).II-Effect of different levels of fertilizer mixtures (NPK) on rate of infestation by some insect pests tocucumber plants:Three rates of ammonium nitrate 33.5% N2 (33.5, 50 and 67 units /fed.), calcium superphosphate 15% P205 (30, 45 and 60 units / fed.) and potassium sulphate 48% K2O (48, 72 and 96 units / fed.) were mixed and applied to soil cultivated withIAAcucumber to find out the relation between NPK levels and rate of infestation by some pests. The obtained results as follow:II.A: Thrips tabaci:Maxima mean rates of T tabaci nymphs + adults infestation occurred on plants received nitrogen fertilizer at its highest rate (67 units) mixed with P2O5 and K2O at rates of 60 + 72, 60 + 48 and 30 + 48 (51.24, 51.10 and 50.68 individuals / leaf, respectively). While, cucumber plants which were treated with lowest rate of N2 (33.5 units/ fed.) associated with 30 + 72 and 30 + 96 units of P2O5 and K2O had the lower infestation rates by T. tabaci (17.40 and 15.56 individuals / leaf, respectively). The cucumber plants which kept free from any fertilizers were infested with lowest rate of T tabaci individuals (8.83 individuals / leaf).II.B: Aphids (mainly A. gossypii and M. Persicae):Infestation rates were generally higher by applying the highest levels of N2 and P2O5 + lowest level of K2O (67 + 60 + 48), as the two seasons mean infestation rate was 18.72 individuals / leaf. On the contrary, cucumber plants which did not received any fertilizers harboured the lowest infestation rate (5.44 individuals / leaf) followed by plants that received the NPK fertilizers at 50 + 45 + 72, respectively (7.60 individuals /leaf).!II 7 7 .7 •II.C: B. tabaci:a: Eggs:The lowest infestation rate by B. tabaci eggs (3.14/ in2 of cucumber leaf) was recorded from control treatment, followed by using the mixture at lowest rates of N2 & P2O5 (33.5+30 units / fed.) + higher rates of K2O (72 and 96 units / fed.), as the plants harboured 4.45 & 5.60 eggs/in2, respectively. Heaviest infestation rates of eggs (12.66 and 11.32 eggs / in2) were obtained after the application of 67 + 60 + 48 and 67 + 60 + 72 units of N2, P2O5 and K2O, respectively.b: Nymphs:Cucumber plant received, the highest rate of infestation by B. tabaci nymphs / in2 (15.19) after treatment with the highest levels of N2, P2O5 (67 + 60 units / fed.) mixed with the lowest rate of 1(20 (48 units), followed insignificantly by application of 67 + 60 + 72 and 67 + 45 + 96 units of N2, P2O5 K2O, respectively with seasonal mean counts of 14.78 and 12.73 nymphs / in2 of leaf, respectively. While, the lowest population density of nymphs (2.45 nymphs / in2) was estimated on cucumber plants which were kept free from fertilizers, followed insignificantly by the count on plants that received the lowest rates of N2, P2O5 (33.5 + 30 units) mixed with K2O at any of the three

tested levels (48, 72 and 96 units), as the recorded mean counts were 3.66, 3.08 and 4.01 nymphs / in2, respectively.c: Adults:As occurred in case of B. tabaci eggs and nymphs, adding N2 at its lowest rate in the fertilizer mixtures was correlated with plants' infestation with fewer counts of B. (abaci adults (3.11 -7.26 adults / leaf). While increasing the applied rate of N2 to maximum (67 units) in the mixtures led to plants infested with higher counts of whitefly adults (15.91 - 24.56 adults/ leaf), it could be recommended that there are a positive relationship between B. !abaci adult counts and the applied rates of N2 & P2O5 and negative relationship between the applied rate of K2O in the fertilizer.II.D: Tetranychus urticae: a: Eggs:Leaves of cucumber plants were noticed to be infested with highest numbers of T. urticae eggs throughout the whole period of plant growth after treatment with the highest rates of N2 & P2O5 (67 + 60 units) mixed with the lowest rate of K2O (48 units) being infested by 43.84 eggs / in2 of leaf, followed by cucumber plants that received 67 + 60 + 72 units of N2, P2O5 and K2O, respectively, which harboured 42.54 eggs/in2. On other direction, plants which were kept free from fertilizer treatment harboured the lowest seasonal mean counts of T. urticae eggs (3.91 eggs / in2), being insignificantly lower than means recorded from treatment by the lowest rate of N2 & P2O5 (33.5 + 30 or 45 units) + either of three tested rates of K2O.b. Movable stages:The lowest mean population density of T. urticae moving stages (5.87 individuals / in2 of cucumber leaf) was recorded from untreated plants. Positive relationship was detected between N2 & P2O5 in relation to infestation rates by moving stages. Plants that received the NPK fertilizers containing the lowest rate of N2 (33.5 units) were infested at rates ranged from 10.93 — 19.58 individuals /in2 of leaf. While, increasing the rate of applied N2 led to increase in the rate of infestation (28.02 -71.70 individuals / in2). The highest moving stages abundance (71.70 individuals / in2) occurred on cucumber plants which received 67 + 60 + 48 units of N2, P2O5 and K2O, respectively.II.E: Effect of NPK fertilizer levels on cucumber yield:The obtained results indicated that applying NPK fertilizer at any rate led to an increase in the cucumber fruits' yield throughout the two studied seasons' altogether, as the cucumber plants treated with highest levels of N2, P2O5 and K2O (67 +60 + 96 units /fed.) produced the highest quantity of cucumber fruits', being 16.43 Kg /plot, followed by plants which were treated with highest levels of N2 & P2O5 mixed with intermediate of K2O (72 units) giving (13.89 Kg / plot). These two values were significantly higher than weights of fruits resulted from either the remaining 26 treatments except for treatment of 67 + 45 + 96 units of N2, P2O5 and K2O units /fed., respectively, which produced 12.68 kg fruits / plot. The previously mentioned treatments were infested by considerable rates of the previously studied pests. On the other extreme, thelowest mean of the two seasons' fruit weight (3.17 kg / plot) resulted from the control plants, while, among the 27 treatments of NPK, the lowest cucumber fruits' yield /plot (6.36 kg) was obtained by using the lowest rates of N2, P205 and K20 followed by lowest rates of N2 & K20 (33.5 + 45 units) mixed with 45 units of P205, as it gave 7.40 kg / plot..III: Efficiency of some chemical and new compounds for suppressing the population densities of aphids and whitefly:The efficiency of different pesticides (Actellic, Actara, Mospilane, Chess, Vabcomek, Naturalis oil; Alotec, Admiral and Biokanza) in suppressing the population of pests under investigation on cucumber plants was estimated after two spray of each compound in the open field.MA: Effect on aphids' population: III.1.A: First spray:The three chemical compounds (Actellic, Actara and Mospilane) caused the highest reduction mean percentage in the aphid counts (58.26, 55.34 and 54.32 %, respectively). While, the lowest reducing effect occurred by applying of Admiral (38.93%), Naturalis oil (35.36%) and Biokanza at 100gm/ 100 L. of water (33.31%). After 24 hours of treatment, Actellic manifested the highest reducing effect (93.02%) and the lowest efficiency on aphids' population obtained by spraying of Biokanza at 100 gm/ 100L. of water (13.64 %). The efficiency of all the compounds increasedafter 3 days of spraying, as Actellic and Mospilane caused the highest reduction (97.67 and 92.51 %, respectively). After 5 days, Actara gave the best effect (92.66 %), while Biokanza reached to its highest reduction effect after 5 days of application as it caused 70.33 and 74.32 % for 100 and 200 gm/ 100 L. of water, respectively.ELLS: Second spray:The same trend of efficiency of.the 9 tested compounds inreducing the population of aphids was also detected as Actellic caused highest reduction percentage (90.12%) after 1 day of treatment, and its effect reached the maximum (93.38%) after 3 days of spraying, being, significantly, higher than reduction percentages caused by the remaining 8 compounds. The effect

of Actara and Mospilane reached 90.00 & 93.55% after 3 days and 91.72 & 85.05% reductions, respectively, after 5 days of application. Vabcomek and Naturalis oil caused their high suppressing percentage after 3 days of application, being 84.51 and 72.46% reductions, respectively. While after 5 days, Chess, Alotic, Admiral and Biokanza at 100 and 200gm/ 100 L. of water caused highest efficacies of 86.83, 79.63, 75.28, 74.09 and 77.48%reductions in the aphids' population, respectively. After 14 days of spraying, Actellic, Actara and Mospilane showed the highest effect among all the applied compounds in the aphids' infestation, 60.14, 59.17 and 60.77% mean reductions, respectively. On the contrary, the lowest mean reduction percentage occurred by applying Biokanza 100 gm/100L.ofwater (39.63 %).CI TAI7lif A RV 250111.2: Effect on whitefly: III.2.A: Effect on adults: 111.2.A.1: First spray:The highest overall mean reduction percentage in B. tabaci adults' population occurred by Actellic compound, then Actara and Mospilane (54.39, 53.38 and 51.95% reductions, respectively. While Biokanza at 100gm/ 100L. of water gave the lowest effect (33.08%).The remaining compounds caused overall mean reduction percentages ranged between 39.61 to 44.31%. Data confirmed also that Actellic was the best compound after 24 hours of application (93.22 % reduction). On the other hand, Actara and Mospilane caused the highest reduction after 3 days of spraying, (94.14 & 87.23 % respectively), and 2 days later, Admiral had the highest effect (76.7 % reduction) among all the tested compounds. Biokanza sprayed at 200 gm / 100 L. of water manifested the highest efficacy (77.88 % reduction) after 3 days of treatment.I11.2.A.2: Second spray:After 24 hours of second spray, Actellic manifested its highest efficacy (95.19 % in B. !abaci adults' count). Those of Actara, Mospilane, Biokanza at 200 gm / 100 L. water and Vabcomek (93.18, 89.83, 80.52 and 80.36 % reductions) occurred after 3 days of treatment. While that of the IGR admiral (78.96 %) occurred after 5 days of application. According to the overall mean reduction percentages after 14 days of spraying, the three chemical pesticides showed highestIll4A/f A P V 251efficacy (59.24, 54.84 and 52.82 % by Actellic, Mospilane and Actara, respectively).III.2.B: Effect on B. tabaci immature stages (nymph, & pupae)III.2.B.1: First spray:As usual, the three chemical pesticides; Actellic, Actara and Mospilane gave the highest efficacies against B. tabaci immatures. Highest efficacy of Actellic occurred 24 hours after spraying (89.63 % reduction), while, those of Mospilane, the modified mineral oil Alotec and the antifeedant Chess were detected after 3 days of treatment (93.71, 81.72 & 77.96 % reductions, respectively). After 5 days of spraying, the highest efficacies of Actara and the bioinsecticide Biokanza at 200 gm / 100 L. of water were detected (92.11 .& 81.86 %, respectively). The overall mean reduction percentages after 14 days of spraying confirmed that the three chemical insecticides were the highest effective against B. tabaci immatures, followed by Biokanza at 200 gm / 100 L. water, causing mean reduction percentages of 60.62, 59.14, 55.09 and 52.89 %, respectively,respectively.III.2.B.2: Second spray:Actellic, Actara and Mospilane caused the highest overall mean reduction percentages; 61.23, 58.03 and 54.62%, respectively, followed by the acaricide Vabcomek (52.38 %) and bioinsecticide Biokanza at the higher rate (49.76 %). Actellic manifested highest efficacy after 24 hours of spray; Actara, Mospilane, Chess, Vabcomek and Natrualis oil at the third dayand Alotec, Admiral, Biokanza with two tested rates were highly effective after five days of application.IV: Releasing Chrysperla carnea larvae for aphids and whitefly control in cucumber field:C. carnea 2nd instar larvae were released at three rates; 3, 6 & 9 larvae / plant for suppressing the population densities of aphids (mainly A. gossypii and M persicae) and nymphs + pupae of B. tabaci.IV.1:Aphids:Releasing C. carnea 2nd instar larvae, at a rate of 9 larvae/ plant gave the best results of bio-control of aphids infesting cucumber plants in the field, as it caused 92.32 % as overall mean reduction percentage in aphids' population after 21 days of release, followed by releasing 3 and 6 larvae/ plant which suppressed the population by 81.86 and 80%, respectively.IV.2:B. tabaci immature stages (nymphs + pupae):Lowest reduction percentage of B. !abaci immature stage populations occurred after releasing C. carnea 2nd instar larvae at level of 3 larvae/ plant which gave 67.81 % mean reduction, in population after 21 days of release. On the contrary, the highest mean reduction percentage (84.89%) was obtained from cucumber plants received 6 larvae/ plant , while those received releasing of 9 larvae / plant caused an overall mean reduction in B. !abaci immatures' population by 78.87%. after 21 days oftreatments.