IV. RESULTS AND DISCUSSION

1. Ecological studies:

1.1. Occurrence of spider families collected from broad bean and cotton crops:

Samples of spiders were collected by pick hand from broad bean and cotton plants, which cultivated at Qaha Station, Qalubiya Governorate and at Seds Station, Beni-Sueif Governorate, during two successive years (2003-2004 & 2004-2005), respectively.

Data in Tables (2-5) and Figs (1-4) show that the present of 13 families during the two successive years. These families are Lycosidae, Philodromidae, Linphiidae, Theridiidae, Miturgidae, Ulobroridae, Oonopidae, Dictynidae, Gnaphosidae, Pholocidae, Araneidae, Thomisidae and Salticidae. They varied in their percentage of occurrences according to two crops and two Governorates surveyed.

1.1.1.Occurrence of spiders families in Qaha Station:

The families Lycosidae, Philodromidae, Theridiidae, Ulobroridae, Dictynidae, Thomisidae and Salticidae have the highest percentage of occurrences in Qaha Station during two successive years in broad bean and cotton crops (Tables 2 and 3). The calculated percentages of occurrence were 12.3, 41.7, 17.8, 5.4, 6.5, 6.1 and 6.4%, respectively, during the 1st year, while these families were 12.9, 34.5, 21.1, 9.2, 9.3, 3.2 and 2.6%, respectively during the 2nd season on the two crops. On the other hand, families Linphiidae, Miturgidae, Oonopidae, Gnaphosidae, Pholocidae and Araneidae, recorded at the lowest percentages of occurrence during the 1st season were 1.1, 1.1, 0.0, 1.1, 0.0 and 0.5%, respectively, but they were 2.3, 2.0, 0.3, 1.0, 0.5 and 1.1%, respectively during the 2nd season on two crops.

Tables (2)

Fig. (1)

Tables (3)

Fig. (2)

1.1.2.Occurrence of spiders families in Seds Station:

In Seds Station, Tables (4 and 5) show that the highest percentage of spider's occurrence during two successive years on broad bean and cotton crops. The familie's percentage of (Lycosidae, Philodromidae, Theridiidae, Ulobroridae, Dictynidae and Salticidae) were 11.7, 42.4, 17.3, 5.3, 8.5 and 5.9%, respectively during the 1st year, while reached to 16.7, 39.8, 13.5, 7.3, 10.6 and 3.6% occurred on the two crops during the 2nd year, respectively. While, families Miturgidae, Gnaphosidae, Pholocidae, Araneidae and Thomisidae recorded the lowest percentages they were 2.6, 0.0, 0.0, 2.9 and 3.4% during the 1st season and 2.5, 0.3, 0.7, 1.9 and 3.1% during the 2nd year, respectively.

Linphiidae and Oonopidae didn't recorded during the two successive years on broad bean and cotton crops, also Gnaphosidae and Pholocidae didn't recorded during the 1st season on two crops.

1.2. The percentage of spider families and occurrence of their species during two successive years:

1.2.1. In Qaha Station (2003/2004):

Data in Table (6) and Fig. (5) show that percentage of family and their species during (2003-2004) year.

Family: Lycosidae was represented by one spider species, *Lycorma ferox* with the highest percentage of occurrence 66 and 30% during December and January, respectively on broad bean and 44% during May on cotton plants.

Family: Philodromidae was collected by one spider species, *Thanatus albini* with the highest percentage of occurrence 32.4, 35 and 40% during February, March and April, respectively on broad bean and 38.5, 42.6, 56.3, 50.0 and 57.6% during June, July, August, September and October, respectively on cotton plants.

Tables (4)

Fig. (3)

Tables (5)

Fig. (4)

Family: Linyphiidae was represented by one spider species, *Helophora* sp. on broad bean with moderately percentage of occurrence 13% in December and low percentage of occurrence during May and June on cotton plants.

Family: Theridiidae was collected from broad bean by four spider species, *Anelosimisus aulicus, Theridion* sp., *Theridion egyption* and *Steatoda albomaculatus* with the highest percentage of occurrences 21.6, 20.0 and 27.5% during February, March and April, respectively with 17.3, 20.0, 28.3 and 28.8%, during July, August, September and October, respectively on cotton plants.

Family: Miturgidae was recorded by two spider species, *Clubiona riporia* and *Chiracanthium isicum* with low percentage of occurrence on both of broad bean and cotton plants during March, April and September months.

Family: Uloboridae was collected on broad bean by one spider species, *Hyptiotes eavatus* with highest percentage of occurrence with 20.0 and 12.5% during December and April while, the percentages were moderately on cotton plantss in two successive years.

Family: Dictynidae was represented by three spider species, *Dictyna valucripes, Dictyna civia* and *Callobius benretti* with moderately percentage of occurrence on board bean and cotton plants.

Family: Gnaphosidae included one spider species, *Gnaphosa muscarum* with low percentage of occurrence which ranged between 5.0 to 8.0% on broad bean and cotton plants during March and May.

Family: Araneidae was collected on cotton by one spider species, *Neoscona oxacensis* with low percentage of occurrence with 3.6% during September in case cotton plants.

Table (6)

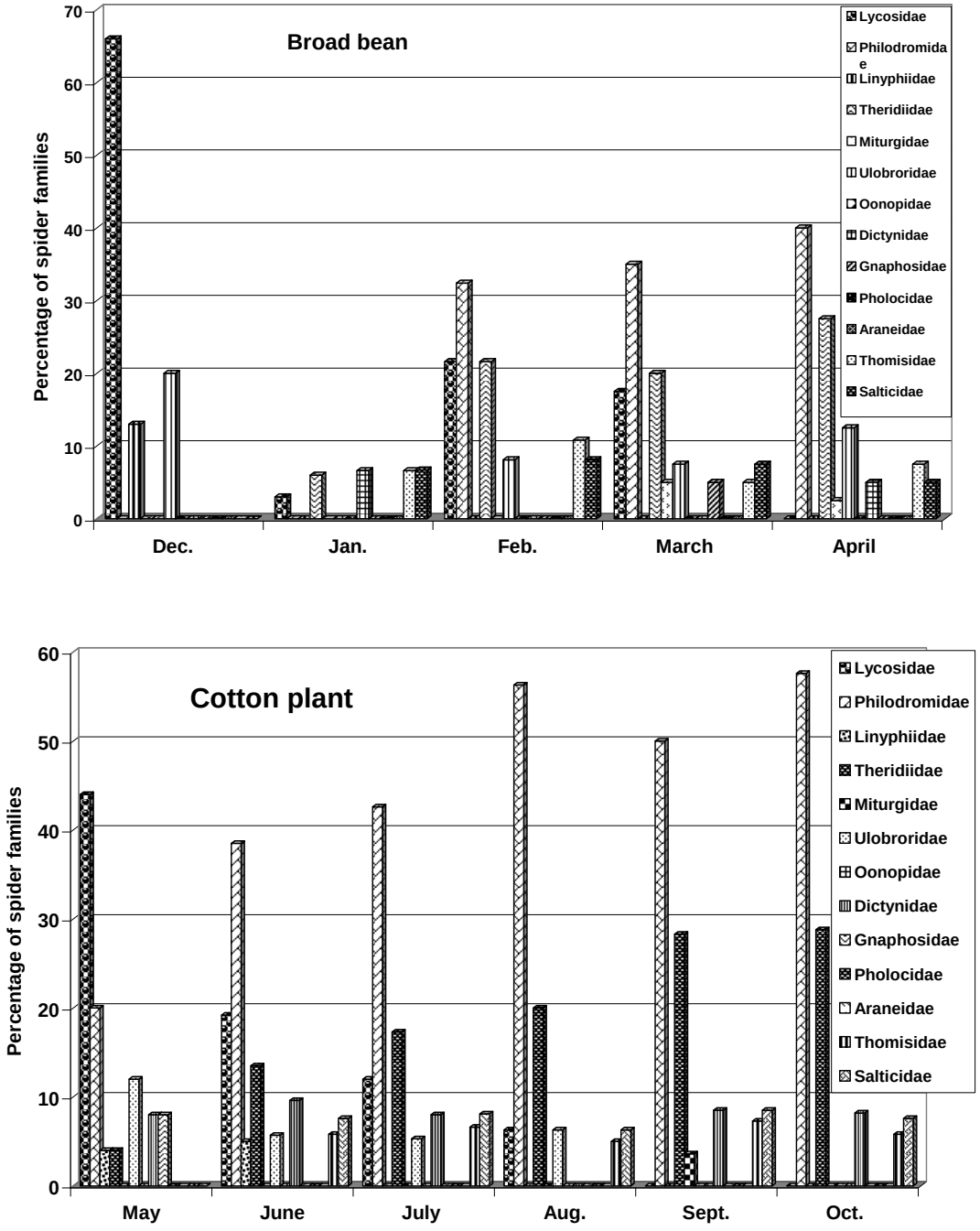


Fig. (5): Percentage of spider families on broad bean and cotton plants during (2003-2004) season at Qaha Station, Qalubiya Governorate.

Family: Thomisidae was recorded by two spider species, *Misumenops asperatus* and *Thomisus onustus* with low and moderately % of occurrences on broad bean were 6.6, 10.8, 5.0 and 7.5% during Jan. Feb. March and April, respectively, while they were 5.8, 6.6, 5.0, 7.3 and 5.8 during June, July, August, Sept. and October, respectively on cotton plants.

Family: Salticidae was collected from broad bean and cotton plants it was found two spider species, *Habronattus borealis* and *Eris marginata* with low percentages of occurrences on two crops were 6.7, 8.1, 7.5 and 5.0 during Jan. Feb. March and April, respectively, but they were 7.6, 8.1, 6.3, 8.5 and 7.6 during June, July, August Sept. and October, respectively on cotton plants.

1.2.2. In Qaha Station (2004-2005):

Data in Table (7) and Fig. (6) show that the percentages of spider families and their species during 2004-2005 at Qaha Station on broad bean and cotton crops.

Family: Lycosidae was collected from broad bean with the highest percentages of occurrences 60.0, 30.9 and 22.2 during Dec. Jan. and Feb., respectively on broad bean, while they were 35.1, 22.5 and 12.6 during May, June and July on cotton plants.

Family: Philodromidae was recorded with the highest percentages of occurrences 23.3, 26.2, 33.3, 42.2 and 45.9% during Dec., January, February, March and April on broad bean, respectively and 14.3, 35.0, 28.6, 32.9, 40.0 and 40.5% during May, June, July, August, September and October on cotton plants, respectively.

Family: Theridiidae was recorded on broad bean with the highest percentages of occurrences 21.4, 24.4 and 25.0% during January, March and April, respectively while, found 25.0, 20.6, 25.7, 33.3 and 25.3%

Table (7)

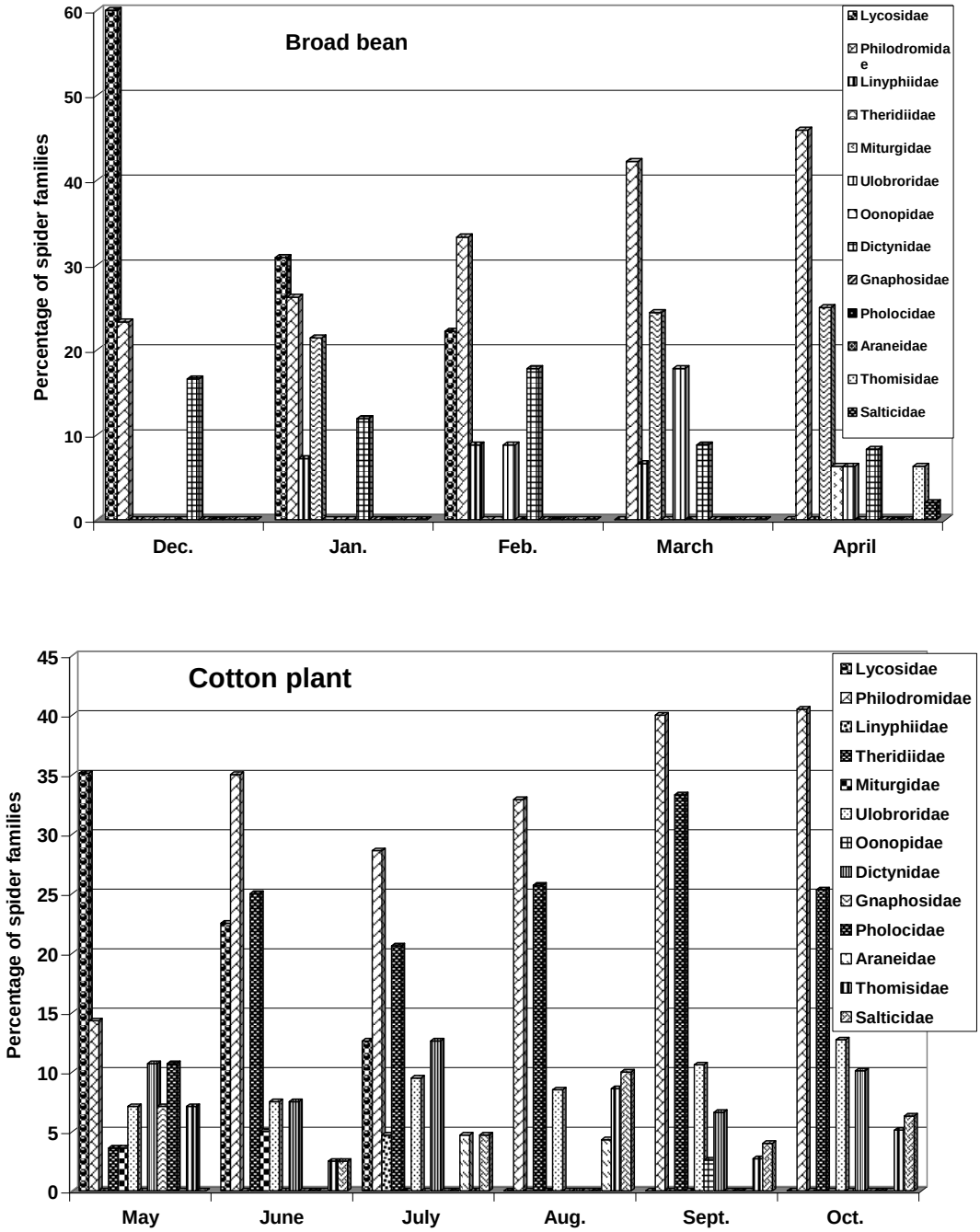


Fig. (6): Percentage of spider families on broad bean and cotton plants during (2004-2005) season at Qaha Station, Qalubiya Governorate.

during June, July, August, September and October on cotton plantss, respectively.

In the three Families: Linyphiidae, Miturgidae and Thomisidae were recorded in some months with low percentages of occurrences on both broad bean and cotton plants, but the families **Gnaphosidae, Pholocidae and Araneidae** were recorded with low percentages of occurrence in some months on cotton plants only.

All of Families: Ulobroridae, Dictynidae and Salticidae were collected with moderately percentages of occurrences in some months of both broad bean and cotton plants.

Family: Onopidae was recorded on cotton plants by two spider species, *Orchestina saltitaus* and *Lepthphantes nebulosa* with the low percentages of occurrences 2.6% during September.

1.2.3. In Seds Station (2003-2004):

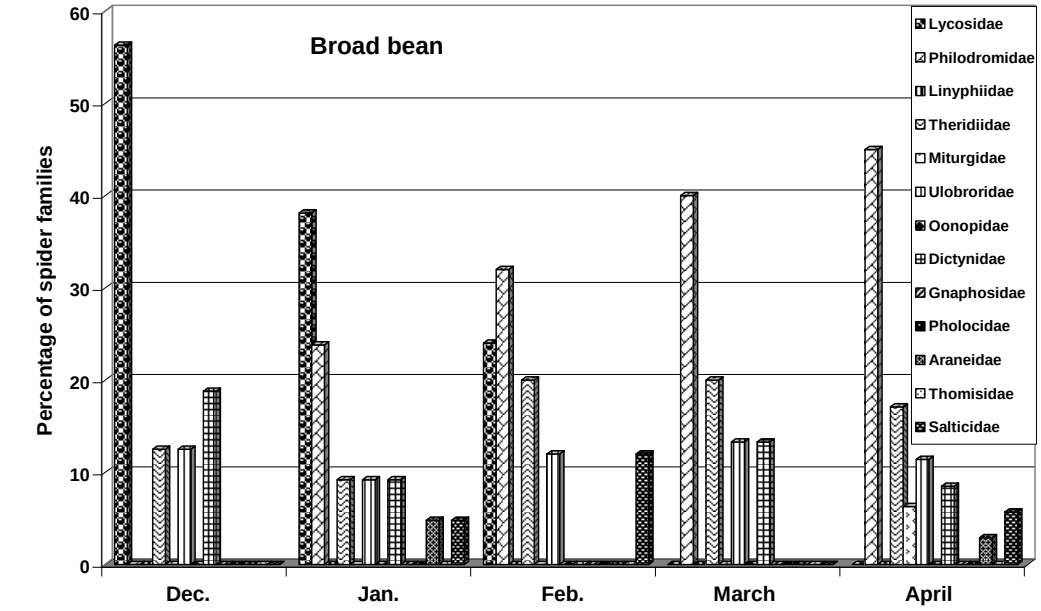
Data in Table (8) and Fig. (7) show that the percentages of spider families and their species during (2003-2004) at Seds Station on broad bean and cotton crops.

Family: Lycosidae was recorded with the highest percentages of occurrences 56.3, 38.1 and 24.0% during December, Jan. and February, respectively, and 50.0 and 20.0% during May and June on cotton plants.

Family: Philodromidae was collected from broad bean with the highest percentages of occurrences 23.8, 32.0, 40.0 and 45.0% during January, February, March and April, respectively, and 30.0, 36.0, 46.9, 54.3, 52.5 and 54.2% during May, June, July, August, September and October, respectively on cotton plants.

Family: Theridiidae was recorded from broad bean with the highest percentages of occurrences 20.0 and 20.0% during February, and March & 20.0 and 20.8% in Sept. and Oct. on cotton plants.

Table (8)



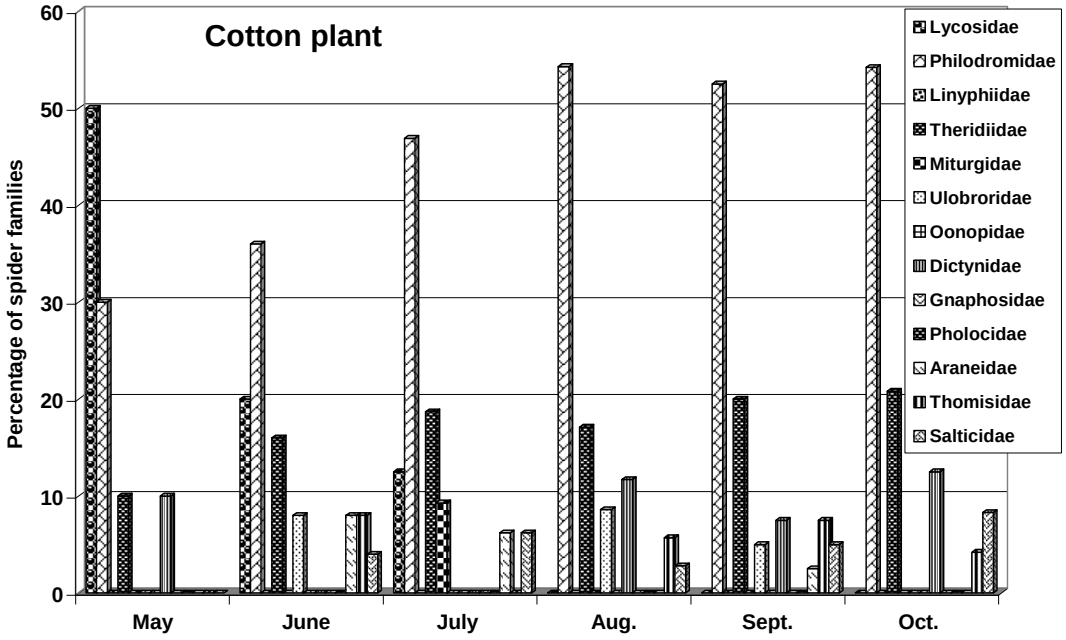


Table (7): Percentage of spider families and occurrence of their species on broad bean and cotton plants during (2003-2004) season at Seds station, Beni-Sueif Governorate.

Both of Ulobroridae and Dictynidae families were collected from broad bean and cotton plants with the moderate percentages of occurrences and collected with low in other months at two plants.

All Families: Miturgidae, Araneidae and Salticidae were collected from both broad bean and cotton plants in some months with low percentages of occurrences but the family of **Thomisidae** appeared on cotton plants with low percentage.

The four families Linyphidae, Onopidae, Ganaphosidae and Pholocidae were disappeared in two plants.

1.2.4. In Seds Station (2004-2005):

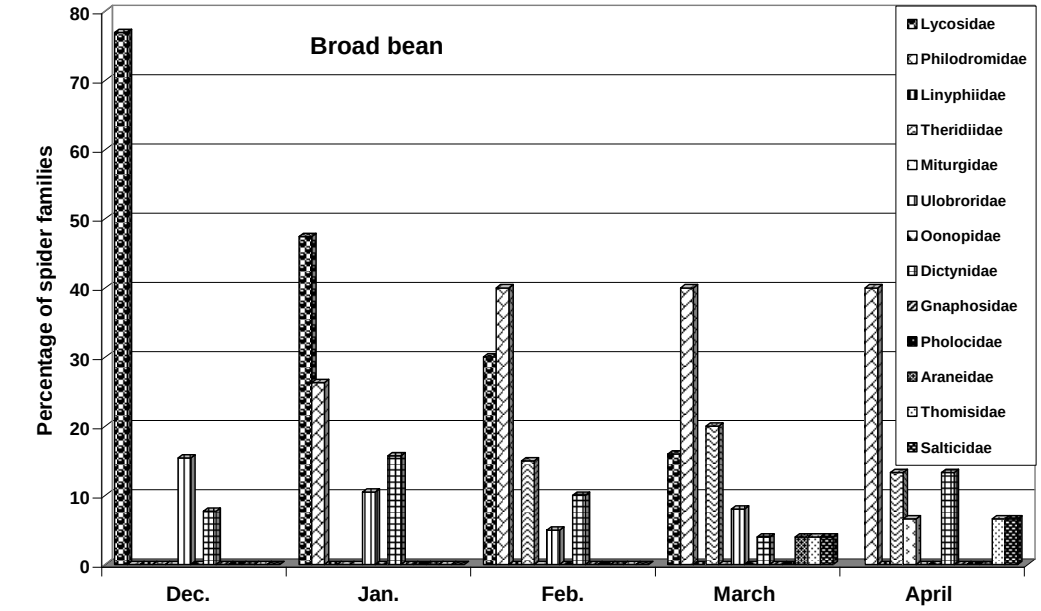
The percentages of spider families and their species during 2004-2005 at Seds Station on broad bean and cotton crops were showed in Table (9) and Fig. (8).

Family: Lycosidae was recorded with the highest percentages of occurrences 76.9, 47.4 and 30.0% during December, January and February on broad bean, respectively, and 62.5 and 31.3 during May and June on cotton plantss, respectively.

Family: Philodromidae was collected from broad bean with the highest percentages of occurrences 26.3, 40.0, 40.0 and 40.0% during January, February, March and April, respectively, and 45.0, 56.0, 48.6 and 52.5% during July, August, September and October, respectively in case cotton plants.

Family: Theridiidae was recorded with the highest percentages of occurrences 20.0% during March on broad bean, while they were 18.7 24.0 and 17.1% during June, August and Sept. While, in other months the occurrences of Family: Theridiidae was detected in moderate percentages.

Table (9)



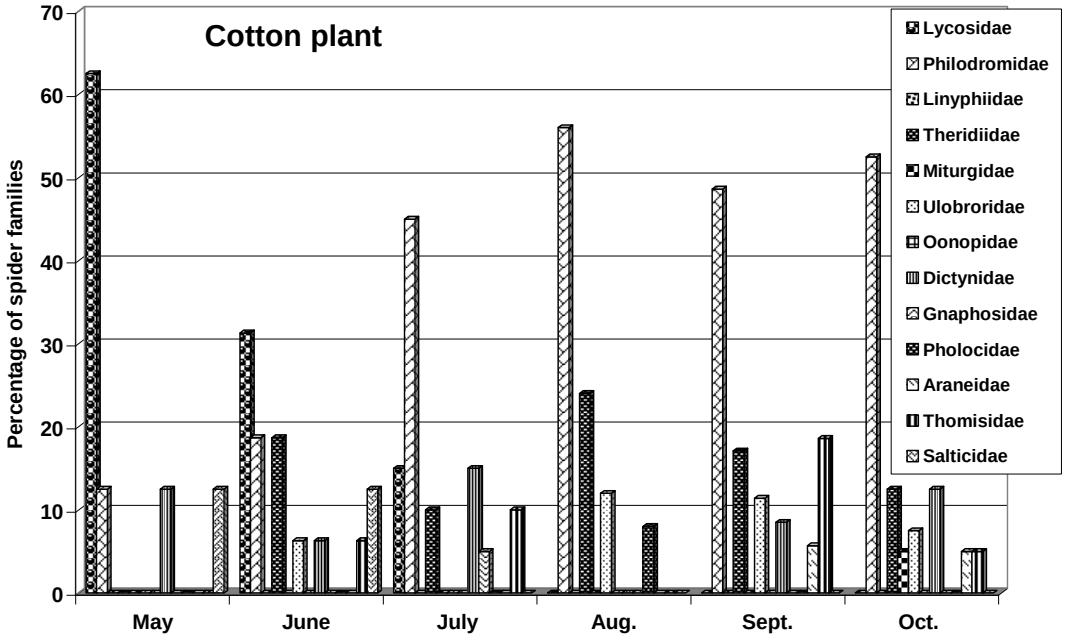


Table (8): Percentage of spider families and occurrence of their species on broad bean and cotton plants during (2004-2005) season at Seds station, Beni-Sueif Governorate.

Ulobroridae, Dictynidae, Thomisidae and Salticidae families were collected with the moderate percentages of occurrences at some months on broad bean and cotton plants.

Both of Miturgidae and Araneidae were detected in low percentages during April and March on broad bean, and detected during October and Sept.-October with low numbers on cotton plants, respectively.

Family Pholocidae was collected from cotton plants by one of spider species, *Physocyclus califoraicus* with low percentages of occurrences 8% during August only.

Generally, the results of this study revealed that occurrence of 13 families containing 229 genera. Some of these families are ground ones like Lycosidae, Gnaphosidae and Ulobroridae. Others are air boreal as Philodromidae, Linyphiidae, Theridiidae, Miturgidae, Omopidae, Dictynidae, Pholocidae, Araneidae, Thonisidae and Salticidea were found on cotton and broad bean seasons in the two Governorates (Beni-Sueif and Qalubiya). The percentages of occurrences of families and spider species were varied according to the plants and location. These results closely agree with those obtained by Gabboiur *et al.* (1996), El-Erksousy (2000) and Salam (2002).

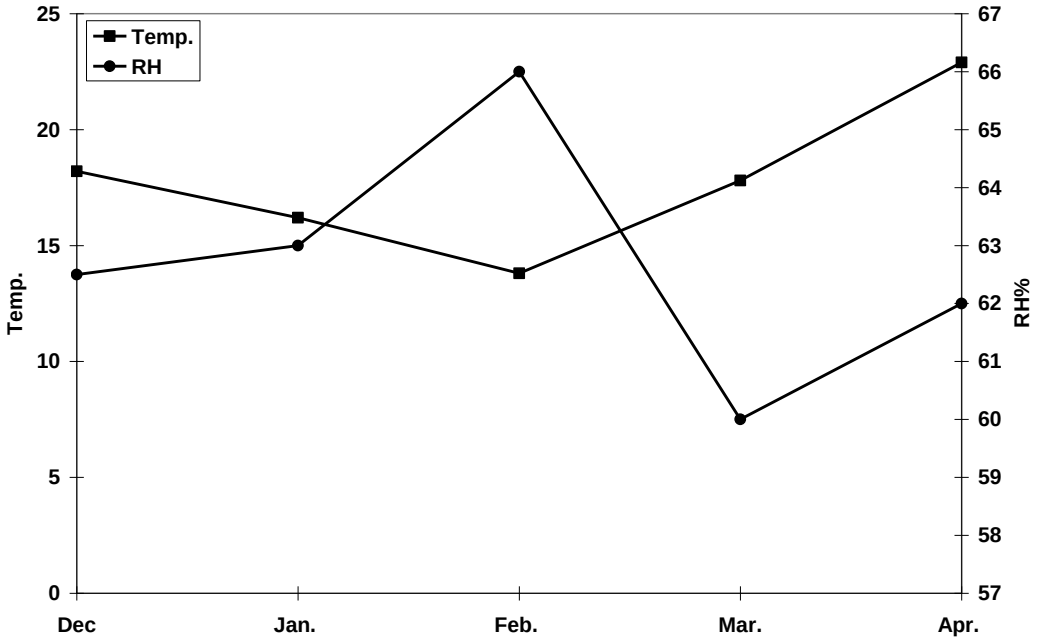
The collected families Linyphiidae, Philodromidae, Ganaphosidae, Lycosidae, Dictynidae, Ubbroridae, Mituridae, Theridiidae, Thomisidae and Salticidea from cotton field as collected by Metwally *et al.* (2002) and Soliman (2003).

1.3. Seasonal abundance:

1.3.1.Population density of predatory spider and their preys (*Spodoptera littoralis, Aphis craccivora* and *Tetranychus urticae*) which collected from broad bean plants at Qaha Station during two successive years (2003-2004) and (2004-2005):

Data in Table (10) and Figs (9&10) indicated that the population density of spiders in the 1st season increased with increasing the population of *T. urticae* with average numbers of spiders were 35, 42, 77,82 and 90 individuals from December to April while the population of *S. littoralis* and *A. craccivora* reached (4, 14), (16, 20), (20, 22), (11-30) and (5, 19) ranged from December to April, respectively, while the temperature were 18.2, 16.2, 13.8, 17.8 and 22.9°C and relative humidity were 62.5, 63.0, 66.0, 70.0 and 62% during December, January, February, March and April, respectively. In the 2nd season the population density of spiders increased than the 1st season. They were 30, 62, 75, 85 and 105 individuals during December to April, respectively, also with decreasing the population of *A. craccivora* with little increasing in population of *S. littoralis* and *T. urticae*. The population of preys were (0, 90 and 0), (5, 85 and 0), (11, 80 and 2), (12, 60 and 3), (15, 20 and 16), respectively, while the temperature were 17.0, 16.2, 13.4, 17.5 and 18.3°C and relative humidity were 60.0, 57.0, 52.0, 70.0 and 51.0, respectively.

Table (10)



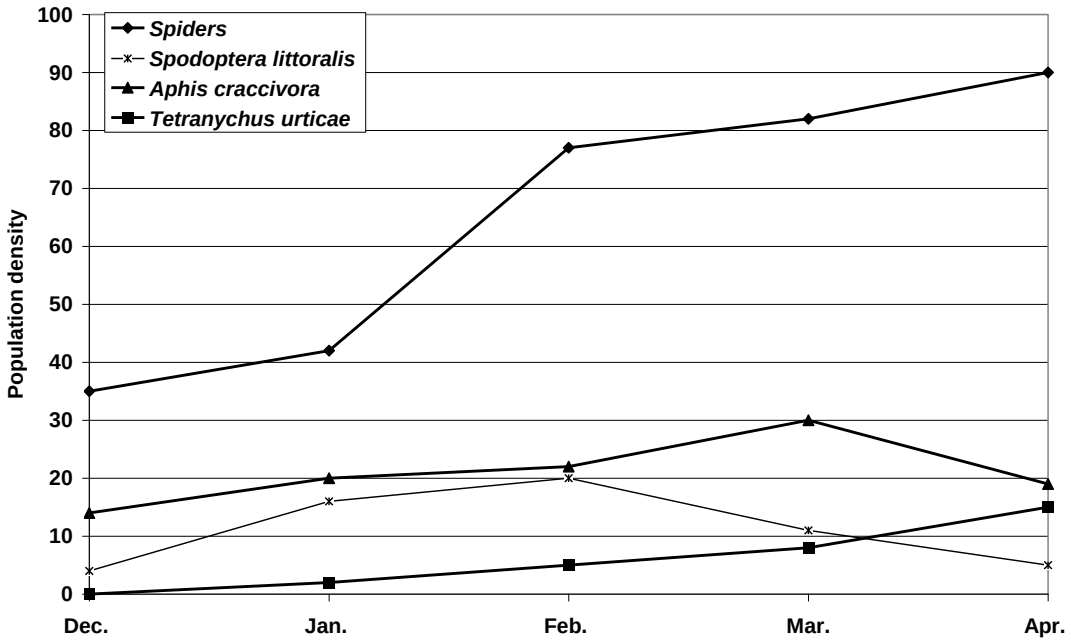


Fig. (9): Population density of predatory spider and their preys on broad bean plants during year (2003-2004) at Qaha Station, Qalubiya Governorate.

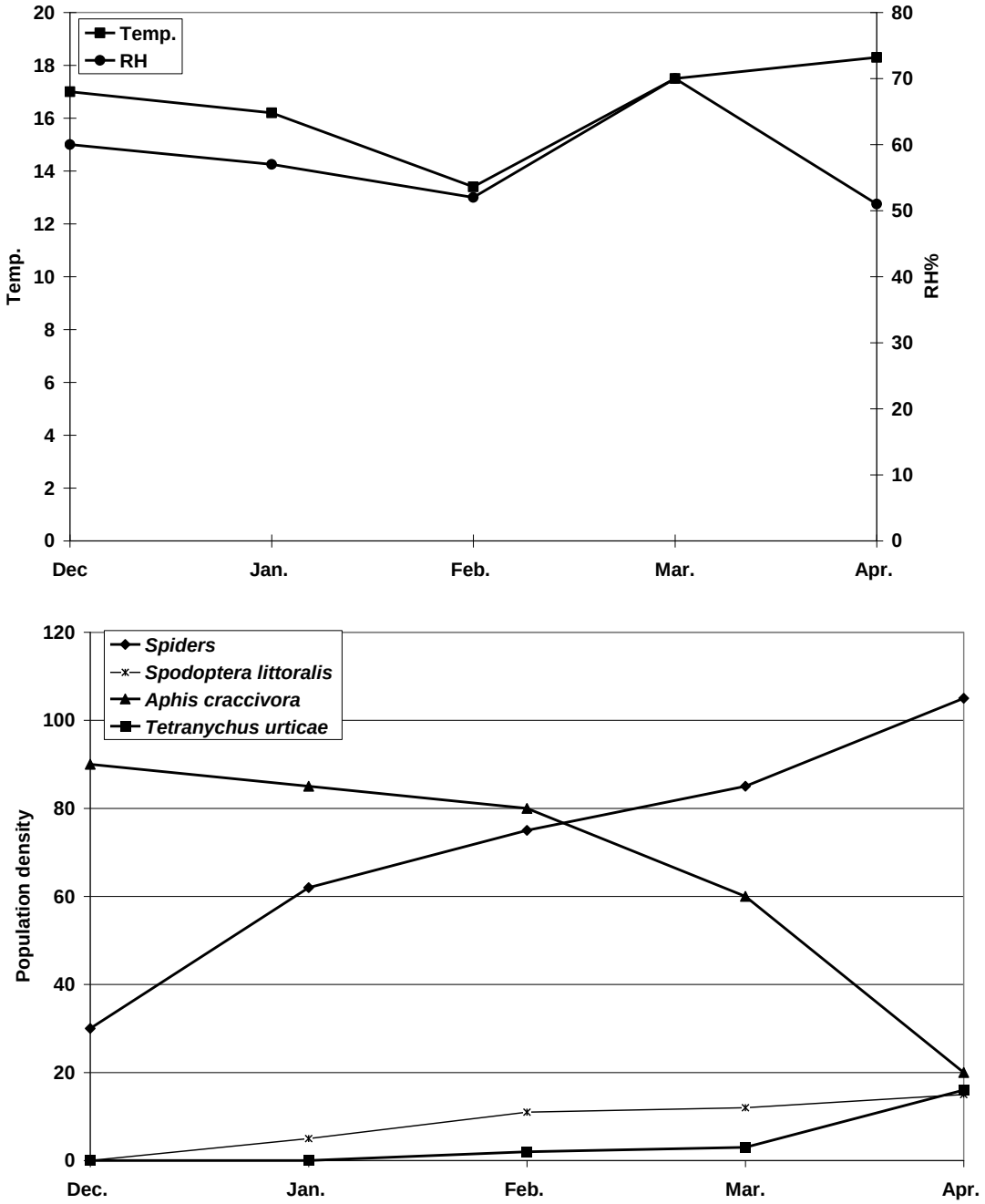


Fig. (10): Population density of predatory spider and their preys on broad bean plants during year (2004-2005) at Qaha Station, Qalubiya Governorate.

1.3.2. Population density of predatory spider and their preys (*Spodoptera littoralis, Aphis gossypii* and *Tetranychus urticae*) which collected from cotton plants at Qaha Station during two successive years (2004) and (2005):

Data in Table (11) and Figs (11&12) indicated that the population density of spiders increased from May to August with increasing the population of *T. urticae* and *S. littoralis* the average numbers 25, 52, 75 and 180 during May, June, July and August, respectively and they decreased in Sept. and October to reach 89 and 55, respectively but the population of *A. gossypii* were moderately increasing during May to October. The average numbers of the three preys where (5, 0 and 40), (10, 6 and 40), (17, 6 and 55), (15, 0 and 60), (6, 14 and 45) and (5, 20 and 40) from May to October, respectively, while the temperature were 23.7, 25.8, 29.2, 28.3, 26.9 and 27.2°C and relative humidity were 59, 59.5, 57.5, 56.5, 57.0 and 54.0%, respectively. In the 2nd season (2005) the population density of spiders increased with increasing of *T. urticae* they were 28, 40, 63, 70, 75 and 79, respectively and the population of *T. urticae* reached 15, 30, 40, 40, 66 and 75, respectively during May to October with mean temperature 22.2, 25.3, 27.0, 28.5, 28.3 and 24.1°C and relative humidity were 51.5, 51.5, 58.5, 58.0, 55.5 and 56.5, respectively. On the other hand, the population density of *S. littoralis* and *A. gossypii* deceased to 7 and 8 individuals only during October, respectively.

1.3.3. Population density of predatory spider and their preys (*Spodoptera littoralis, Aphis craccivora* and *Tetranychus urticae*) which collected from broad bean plants at Seds Station during two successive years (2003-2004) and (2004-2005):

Data in Table (12) and Figs (13&14) clearly that the population density of spiders in the 1st year increased with increasing the population

Table (11)

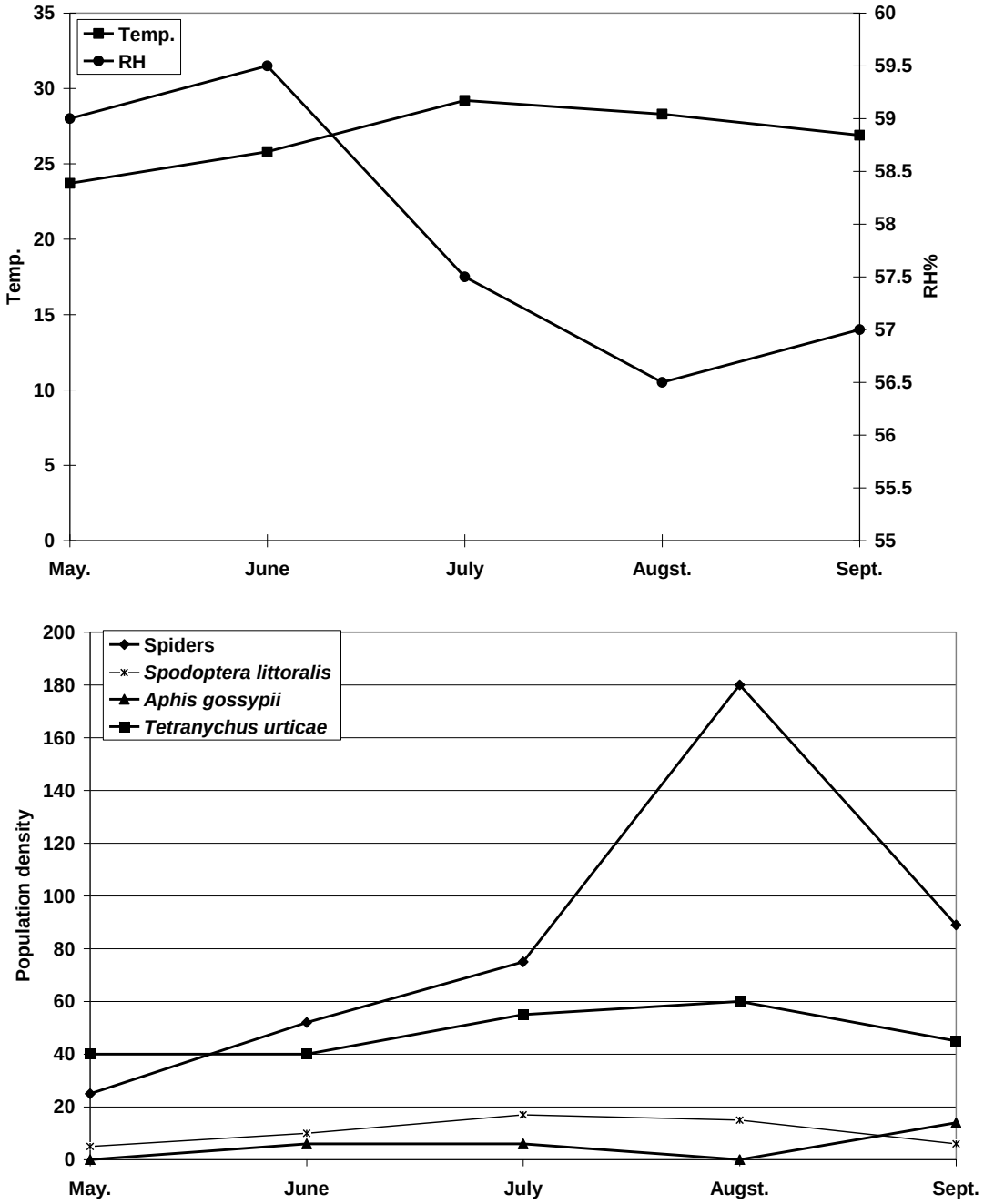


Fig. (11): Population density of predatory spider and their preys on cotton plants during year (2004) at Qaha station, Qalubiya Governorate.

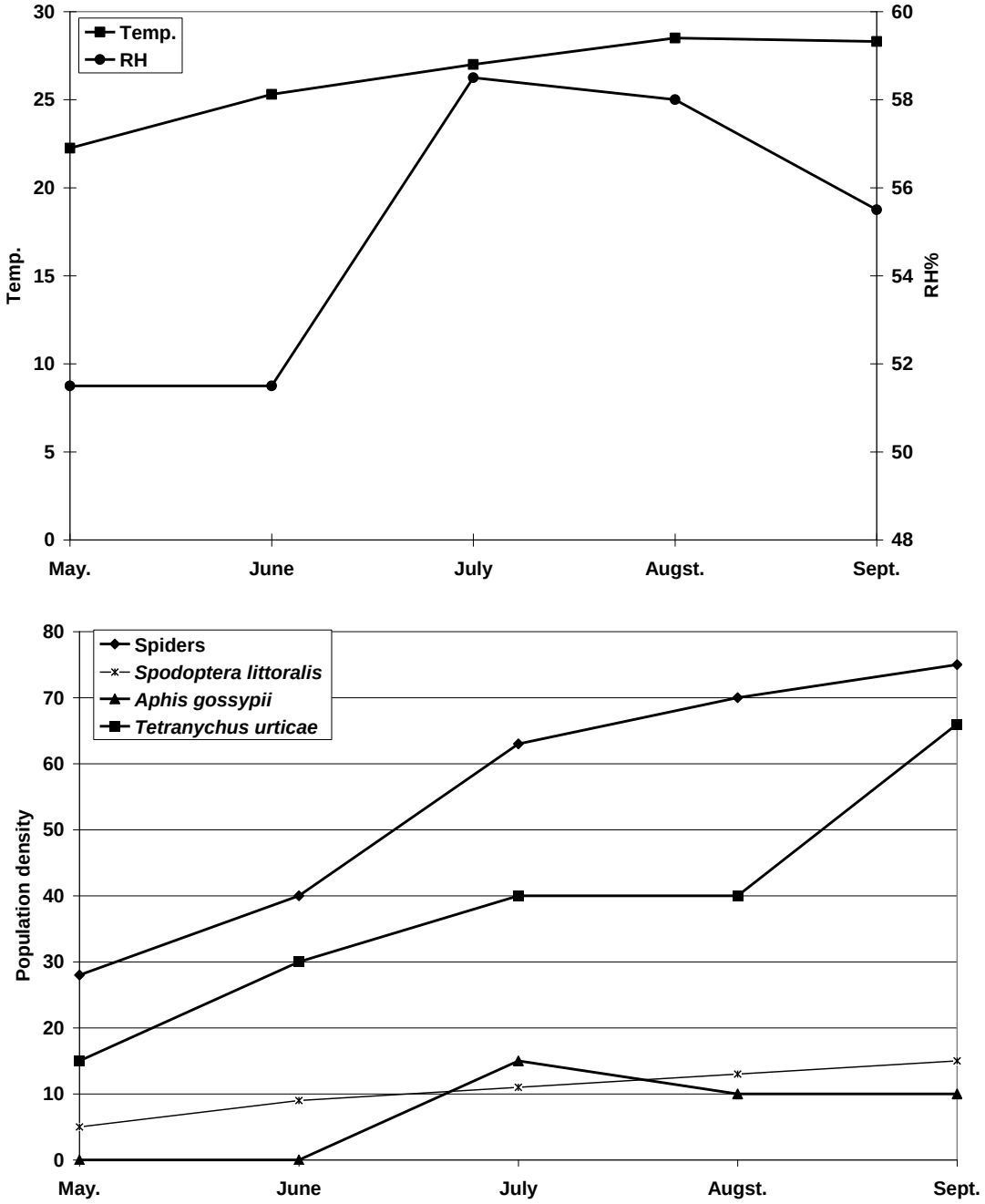


Fig. (12): Population density of predatory spider and their preys on cotton plants during year (2005) at Qaha station, Qalubiya Governorate.

of *S. littoralis*, the average numbers of spiders were 16,41,55,60 and 72 individuals from December to April while the population of *T. urticae* was moderately increased with average numbers 17 during April, but the population of *A. craccivora* decreased which reached (6 individuals) during April, where the temperature were 18.9, 16.2, 14.4, 20.5 and 26.0°C and relative humidity were 57.0, 53.0, 55.5, 53.0 and 51.0% from during December to April, respectively. In the 2nd year the population density of spiders increased with slightly increasing the population of *T. urticae*. The population of spiders 13, 25, 40, 45, and 60 individuals during December, January, February and April, respectively the population density of *A. craccivora* increased with 85 individuals in Feb. and gradually decreased to reached 55 individuals at the end of season. On the other hand, the population of *S. littoralis* decreased from December to April, while the temperature were 15.5, 16.2, 15.2, 18.2 and 21.3°C and relative humidity were 54.5, 56.0, 46.5, 48.0 and 51.0, respectively from December to April.

1.3.4. Population density of predatory spider and their preys (*Spodoptera littoralis, Aphis gossypii* and *Tetranychus urticae*) which collected from cotton plants at Seds Station during two successive years (2004) and (2005):

Data in Table (13) and Figs (15&16) indicated that the population density of spiders on 2004 increased with increasing the population of *T. urticae* with average numbers 10, 25, 32, 35, 40 and 48, respectively while, the population of *T. urticae* were 45, 47, 50, 52 and 55 individuals from June to October, respectively, but the population of *S. littoralis* and *A. craccivora* decreased during May to October. The temperatures were 26.3, 28.7, 30.3, 27.9, 25.9 and 27.8°C and relative humidity were 48.5, 44.0, 47.5, 52.5, 49.5 and 45.0%, respectively.

Table (12)

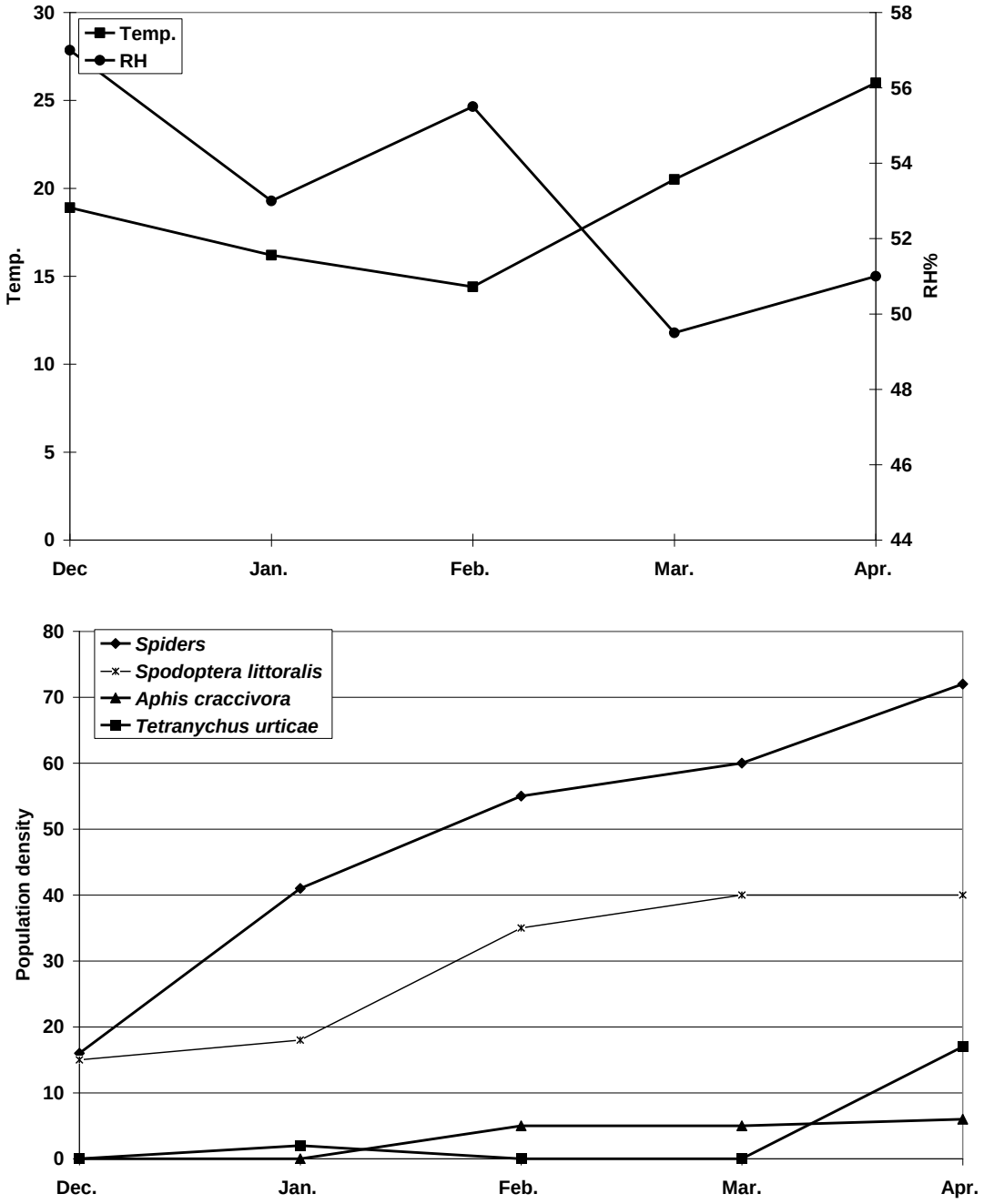


Fig. (13): Population density of predatory spider and their preys from broad bean plants during year (2003-2004) at Seds station, Beni-Sueif Governorate.

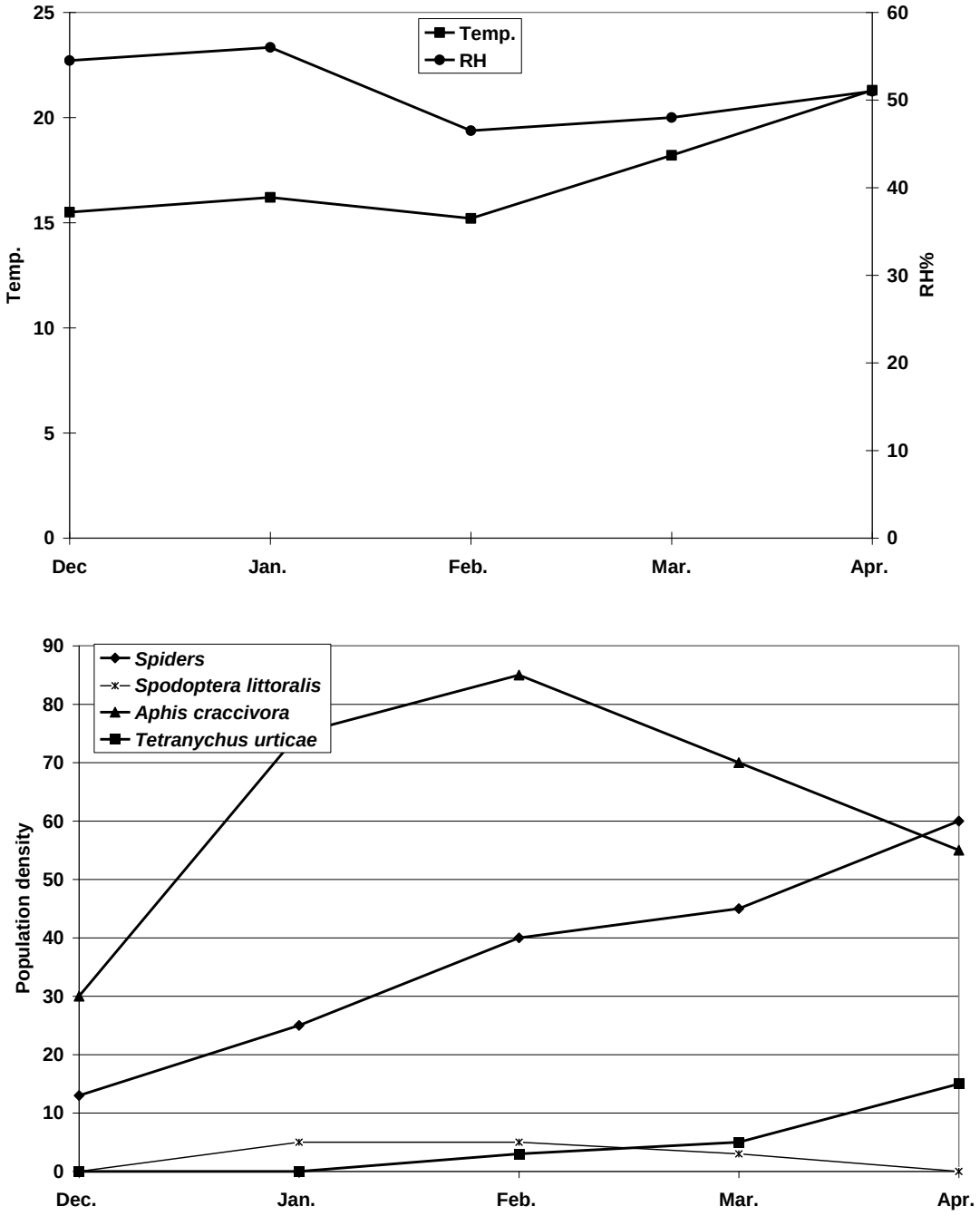


Fig. (14): Population density of predatory spider and their preys from broad bean plants during year (2004-2005) at Seds station, Beni-Sueif Governorate.

During the 2nd season (2005) the slightly increasing of the population of spiders they were 8, 16, 26, 30 and 65 respectively, from May to August and dropped to reach 30 in Oct. But the population of *A. gossypii* reached 4, 10, 15 and 25 individuals from May to Oct., respectively and the population of *S. littoralis* reached 5, 6, 6, 9, 10 and 10 individuals, respectively from May to October but in case of *T. urticae* the population increased from May to August, respectively, while, it decreased during September and October, with the mean temperature were 16.1, 27.6, 28.3, 32.2, 30.3 and 25.2°C and relative humidity were 52, 46, 49, 45.5, 43 and 45.5%, respectively.

In conclusion, the high population density of spider depended on three factors density of preys, high temperature and naturally high relative humidity.

The high population density occurred in April at broad bean field while, they increased from July to October in cotton field at two Stations with different high temperature and increasing prays as *S. littoralis, A. craccivora* or *T. urticae.*

The low temperature may be the main reason of low densities of spiders. These agreement with Costa (1995) who reported that rain and wind would affect on spider locomotory activity. Qu *et al.* (1986) referred to population density of spider closely correlated with different crops, occurrence of insect pests, faring practices, chemical application and climatic factors, also Nassef *et al*. (1996) reported that the temperature and relative humidity were the main factors affecting the population changes of true spider.

Table (13)

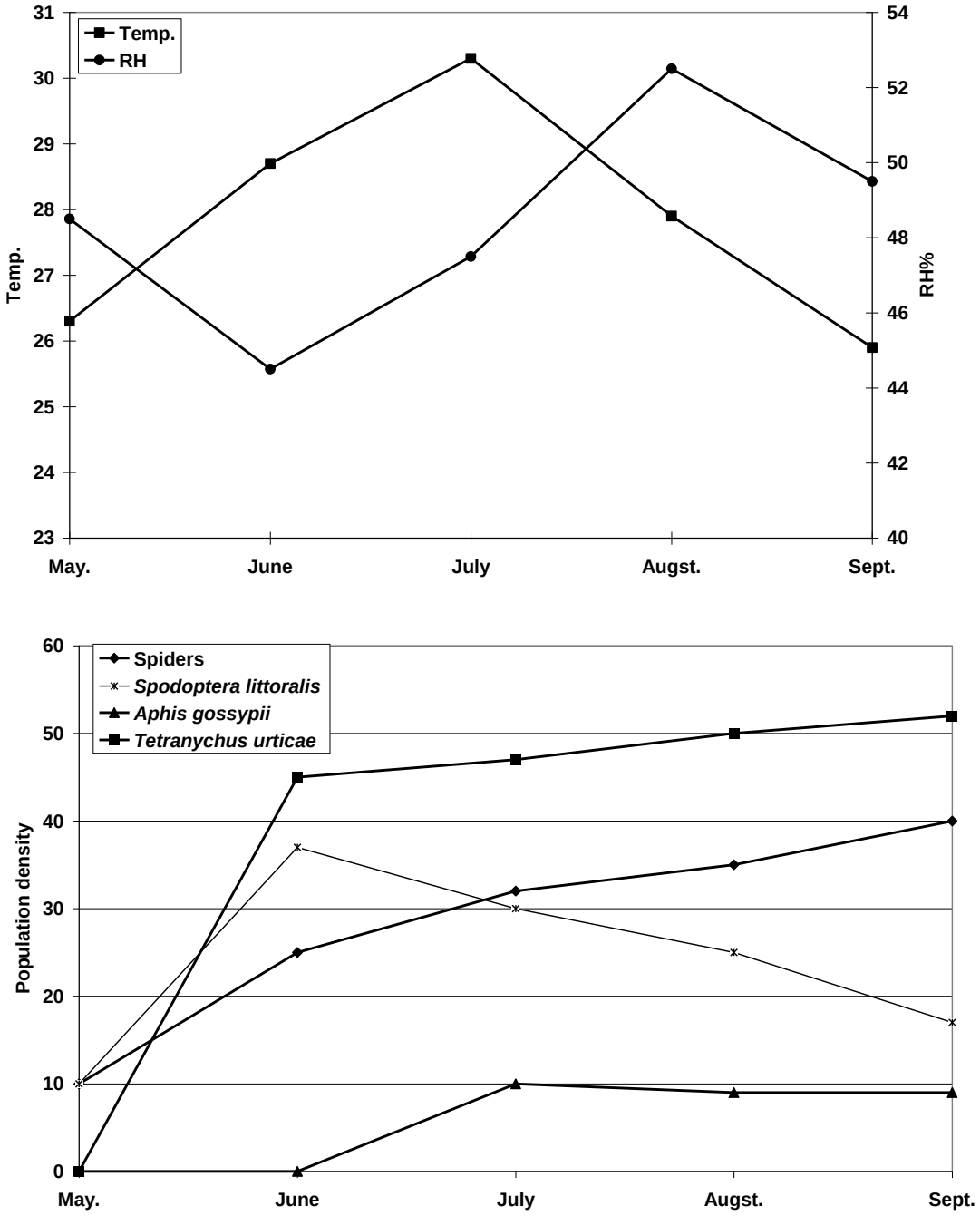


Fig. (15): Population density of predatory spider and their preys from cotton plants during year (2004) at Seds station, Beni-Sueif Governorate.

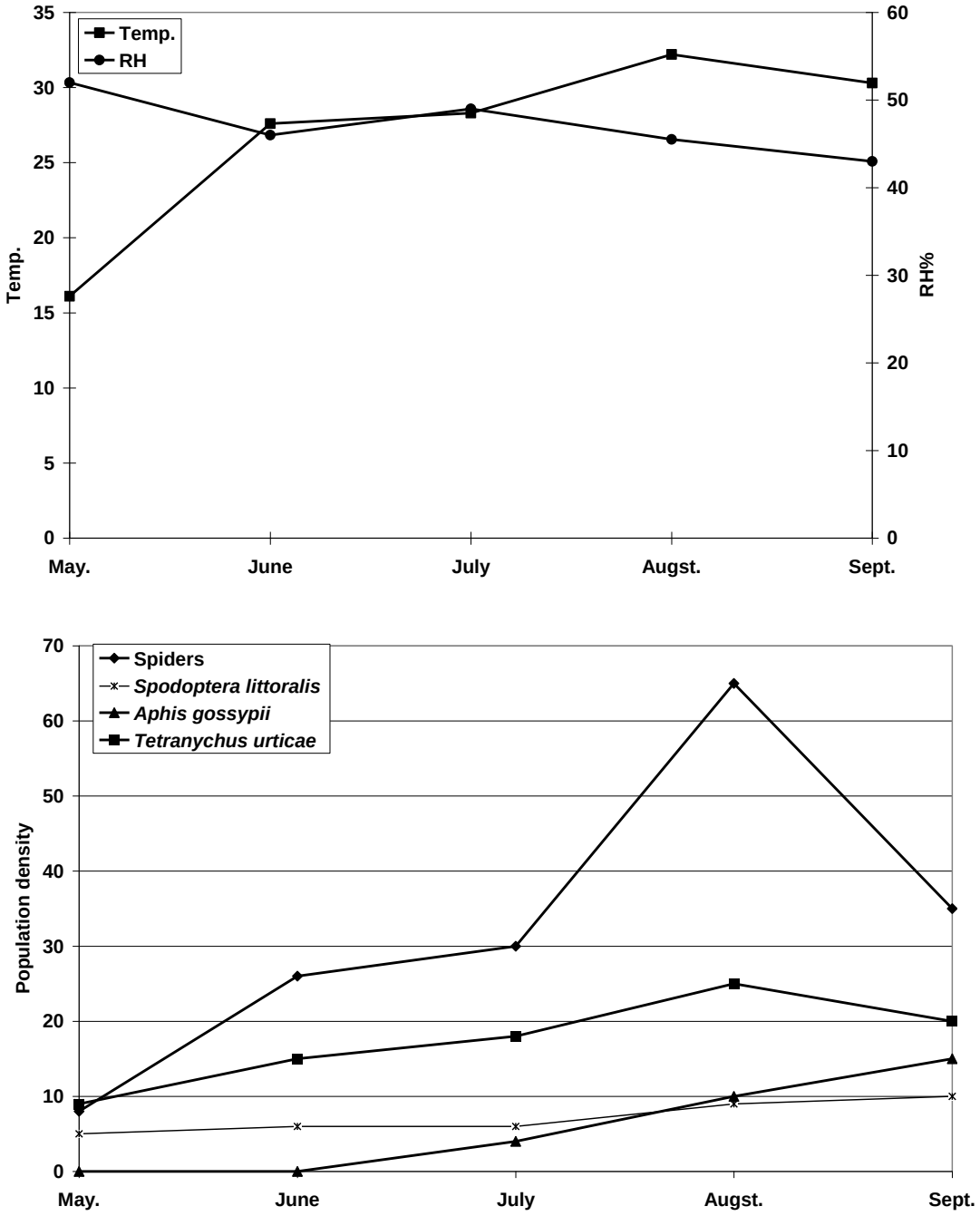


Fig. (16): Population density of predatory spider and their preys from cotton plants during year (2005) at Seds station, Beni-Sueif Governorate.

1.4. Association of spider families and preys on bread bean and cotton plants during two successive years (2003-2004) and (2004-2005) at two stations (Qaha and Seds):

1.4.1. Association of spider families and preys on bread bean and cotton plants during (2003-2004) at Qaha Station:

Data in Table (14) and Fig. (17) cleared that the population density of Family Lycosidae started to decrease gradually during broad bean season. They were 66.0, 30.0, 21.0 and 17.5% from December to March, respectively, but the population density of F. Philodromidae started to increase during this season to reach 40%. Also, both Families: Theridiidae and Ulobroridae had two peaks, the highest peaks were occurred in April and Dec. with 27.5 and 20.0%, respectively, while the lowest peaks were noticed in January and March, 16.0 and 7.5%, respectively.

The population of Families: Miturgidae, Dictynidae, Gnaphosidae, Thomisidae and Saliticidae were dropped considerably at the end of season. On the other hand, the population of *S. littoralis* and *A. craccivora* decreased rapidly to reach 8 and 18%, respectively, but the population of *T. urticae* was increased rapidly to reach 50% at the end of the season.

On the cotton plants, data in Table (14) and Fig. (18) revealed that the population density of F.: Philodromidae had two peaks. The highest peaks one were occurred in August and October with 56.3 and 57.6%, respectively, and then decreased in September reached 50%, also, the population density of only Family Theridiidae gradually increased to reach 20% in August. Then it dropped slowly by Sept. and October, to 18.7 and 18.8%.

Table (14)

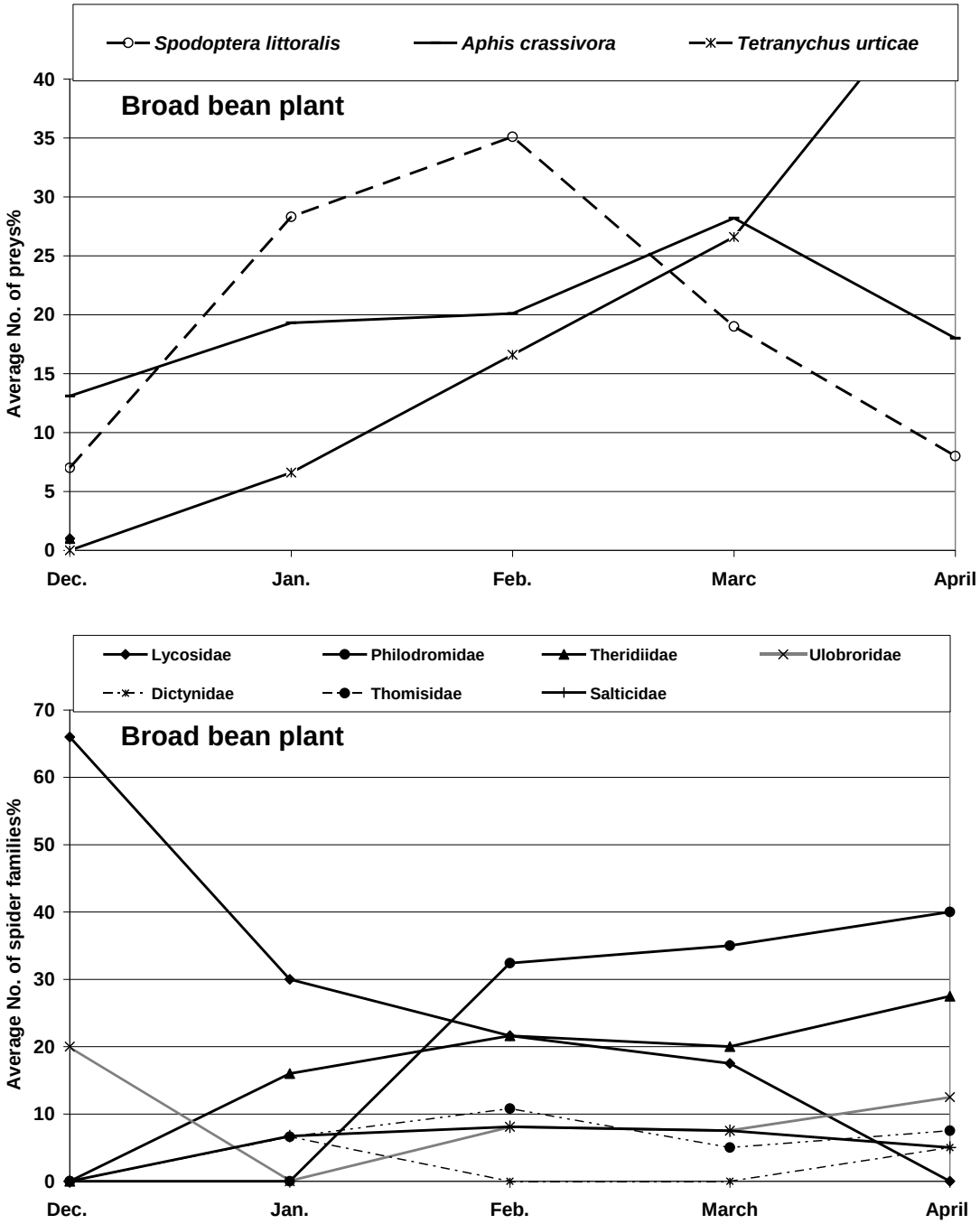


Fig. (17): Association of spider families and preys on broad bean plants during (2003-2004) season at Qaha station, Qalubiya Governorate.

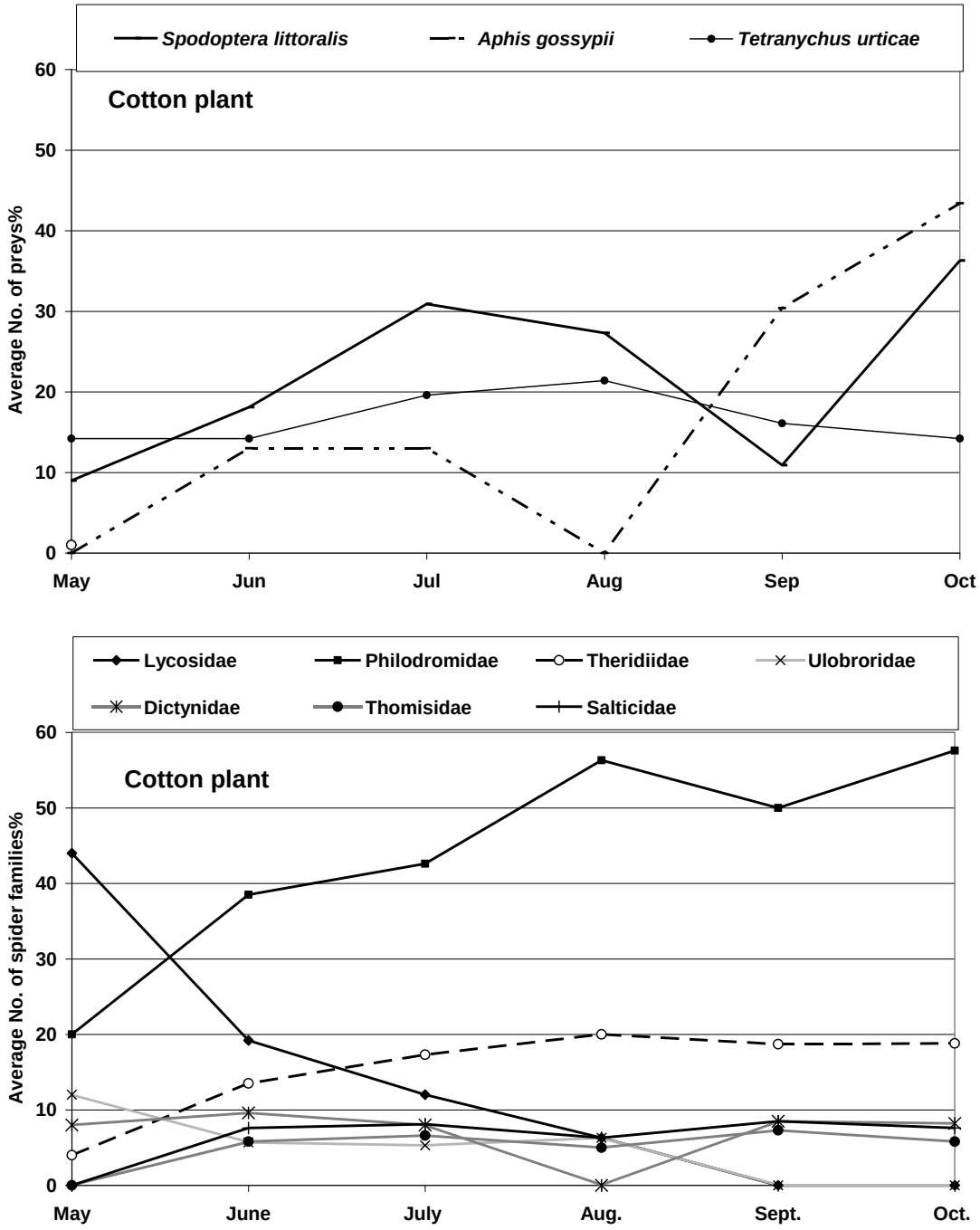


Fig. (18): Association of spider families and preys on cotton plants during (2003-2004) season at Qaha station, Qalubiya Governorate.

The population density of spider Families Ulobroidae, Dictynidae, Thomisidae and Salticidea were vary from increasing to decreasing and but during the season they were increase.

While, the population densities of *S. littoralis* had two peaks, the highest peaks were occurred in July and October, they were (30.9 & 36.3%) and in case *A. gossypii* they were (30.4 & 43.4) in Sept. and Oct., respectively, then the population gradually decreasing in other month, while the population density of *T. urticae* gradually increasing to reach 21.4 in August and decreased gradually to reach 14.2 at the end of the season.

1.4.2. Association of spider families and preys on bread bean and cotton plants during (2004-2005) at Qaha Station:

a) Broad bean:

Data in Table (15) and Fig. (19) cleared that the population density of Families: Philodromidea and Theridiidae started to increase gradually to reach the highest peak in April with percent 45.9 and 25.0%, respectively, while the population of Families: Ulobroridae and Dictynidae were reached 17.8 in March and February, respectively. On the other hand, the population density of *S. littoralis* and *T. urticae* considerably increased with 34.8 and 76.2%, respectively, at the end of season while the population density of *A. craccivora* gradually decreased from 26 to reach 5.9% at the and of the season.

b) Cotton:

Data in Table (15) and Fig. (20) show that the population density of Families: Philodromidae and Theridiidae had two highest peaks at Sept, Oct. and Aug., Sept. with percentages (40.0, 40.5) and (25.7, 33.3), respectively. On the other hand, the population of Family : Uloborodae slightly increased at the end of the season. In case of Families: Dictynidae, Thomisidae and Salticidea the population densities reach to

Table (15)

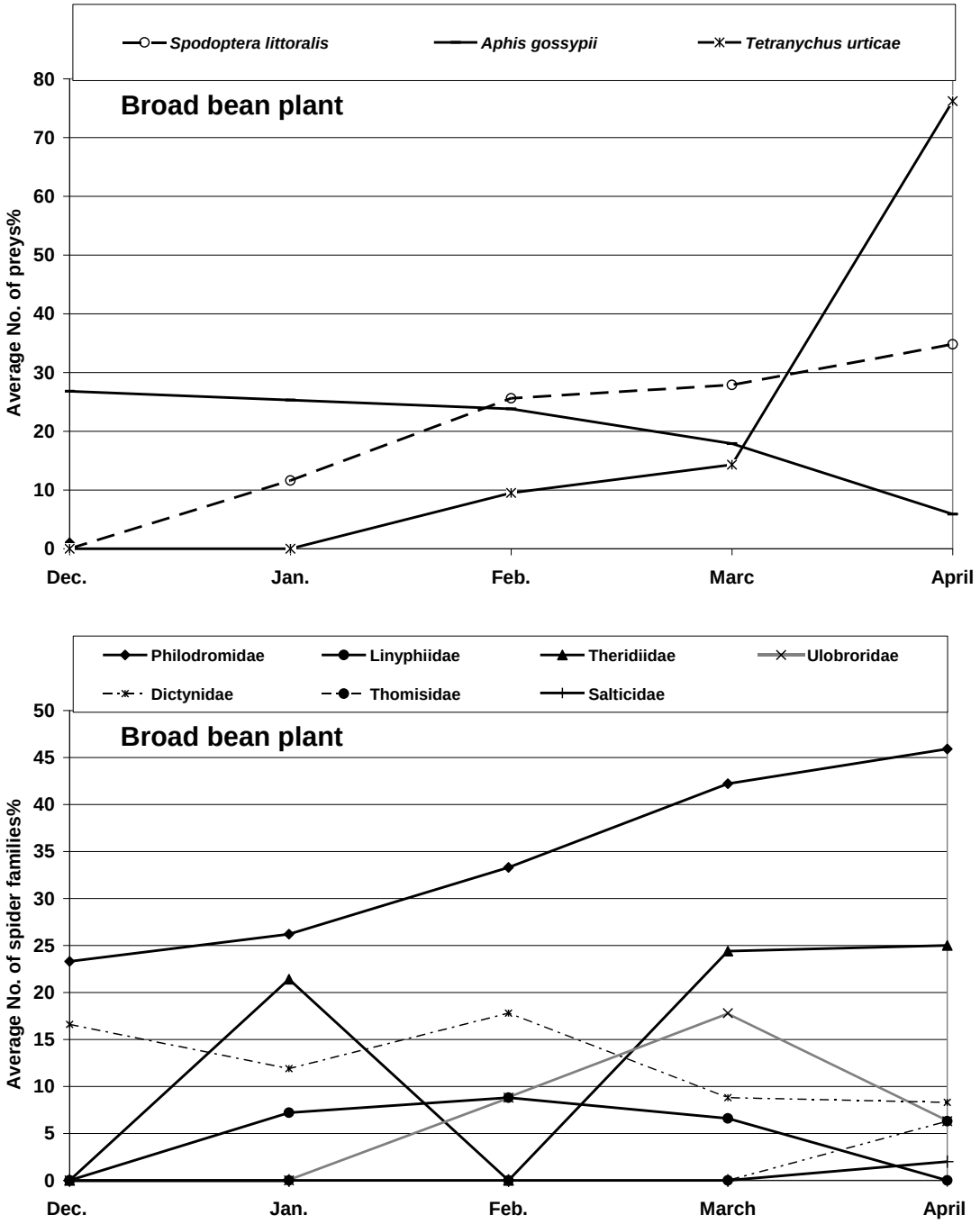


Fig. (19): Association of spider families and preys on broad bean plants during year (2004-2005) at Qaha station, Qalubiya Governorate.

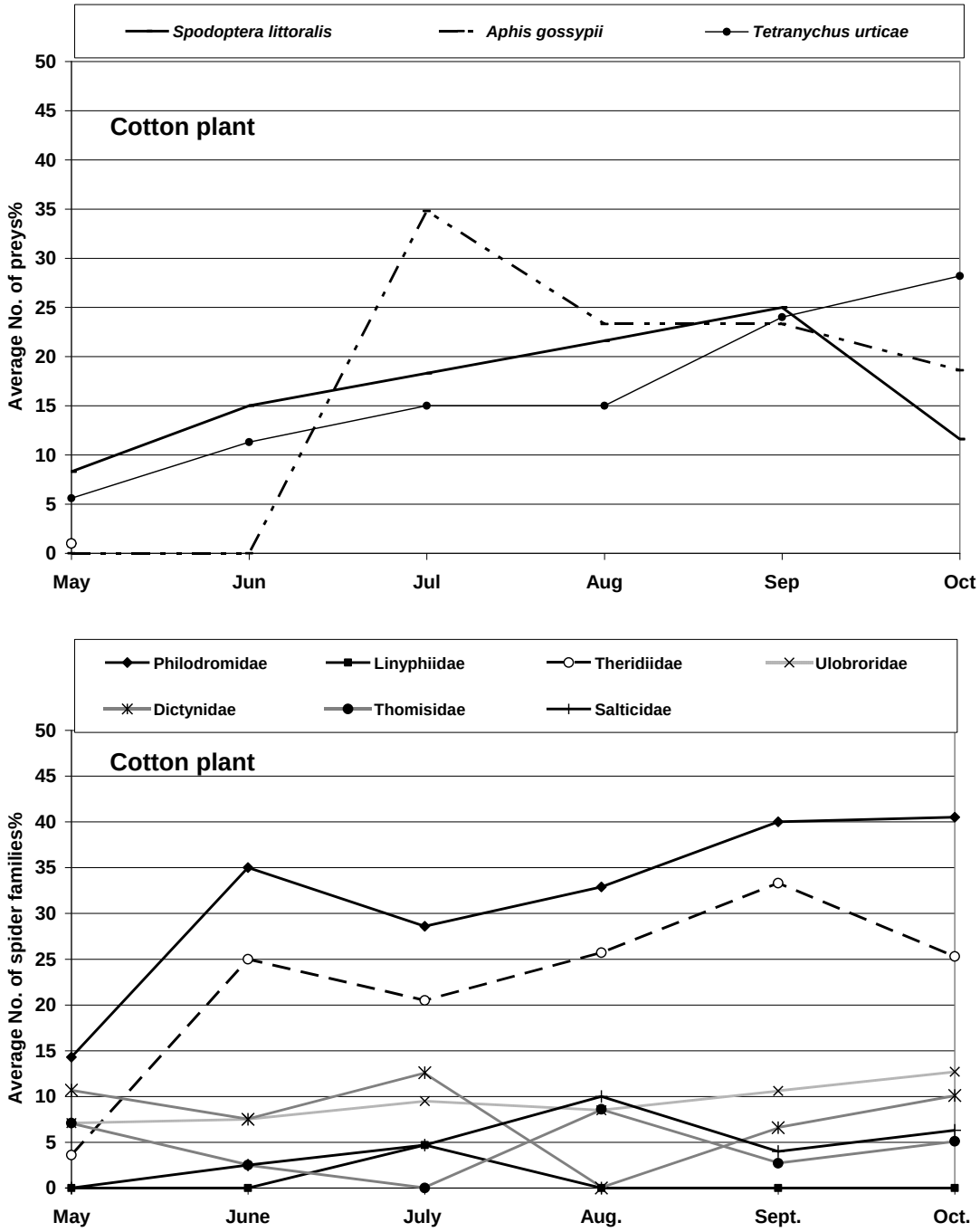


Fig. (20): Association of spider families and preys on cotton plants during year (2004-2005) at Qaha station, Qalubiya Governorate.

the highest values 12.6, 8.6 and 10.0%, respectively, at July, August and August. While, the population density of *A. gossypii* was decreased from *34* to reach 18.6% at the end of the season, but the population density of *T. urticae* was 28.2% at the end of the season, while the population density reached to 25% in Sept. in case of *S. littoralis* and decreased suddenly to reach 11.6% in October.

Generally, the average number of spider and their families were varied according to kind of plants and surveyed location. These results closely agree with those obtained by El-Erksousy (2000) who recorded that twenty families of spider from some crops in El-Beheira and El-Fayoum.

1.4.3. Association of spider families and preys on bread bean and cotton plants during (2003-2004) at Seds Station:

a) Broad bean:

Data in Table (16) and Fig. (21) show that the population density of Family: Philodromidae increase gradually to reach the highest peak at the end of the season, while of Family: Theridiidae had three peaks; the highest two equal peaks were in February and March with 20.0%, while the lowest peak occurred in January with 9.2%. While Family Dictynidae had two peaks, the highest two peaks were in December and February, they were 18.8 and 13.3%, also, the population density of Family: Salticidae increased during February to reach 12.0%, then dropped in Jan. and April months. The population density of the three preys was gradually increased to reach 27.0, 37.5 and 89.4%, respectively at the end of the season.

b) Cotton:

Data in the same table and Fig. (22) show that the population density of Family: Philodromidae gradually increased to reach the highest peaks in August and October, they were 54.3 and 54.2%, but it dropped

Table (16)

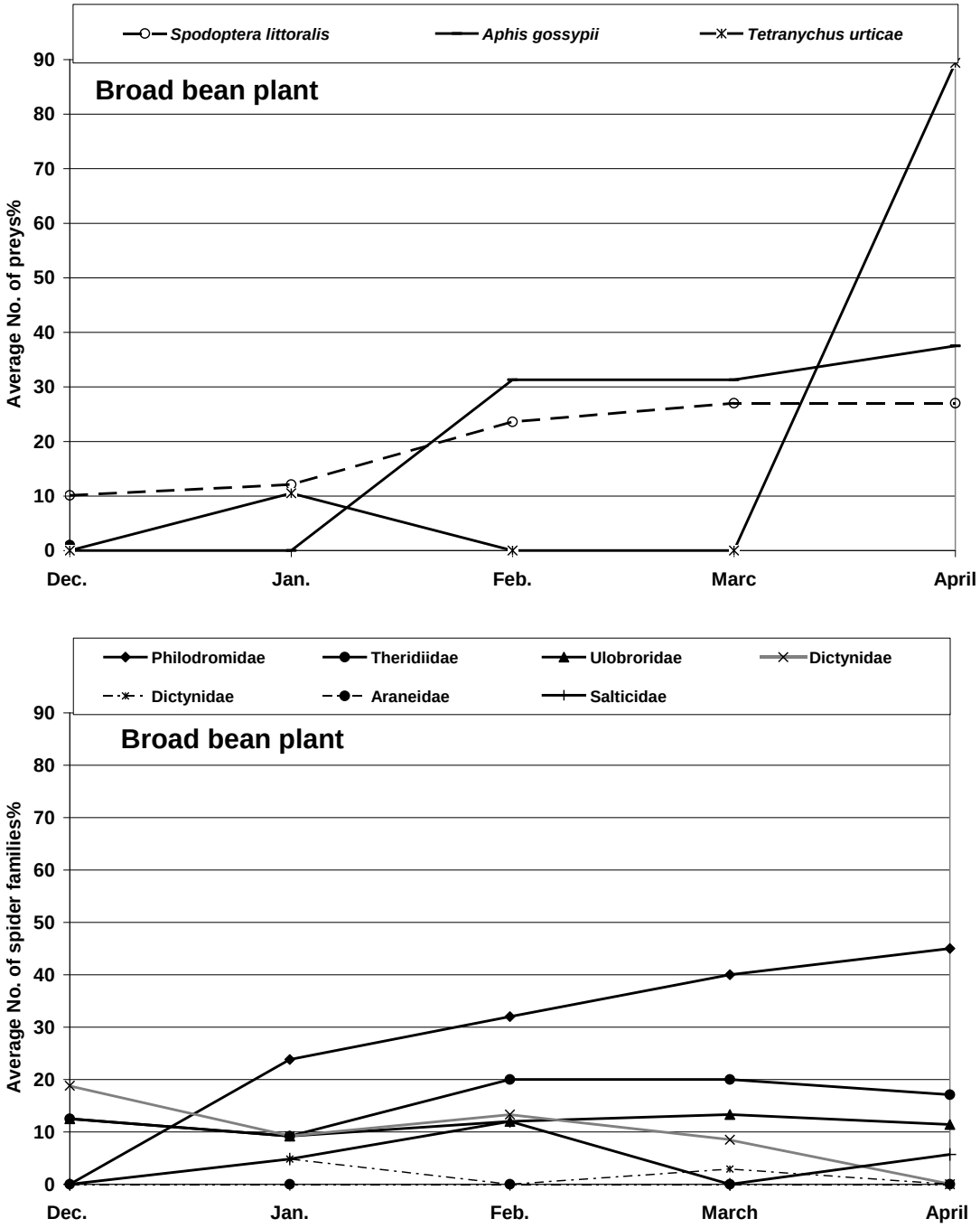


Fig. (21): Association of spider families and preys on broad bean plants during (2003-2004) season at Seds station, Beni-Sueif Governorate.

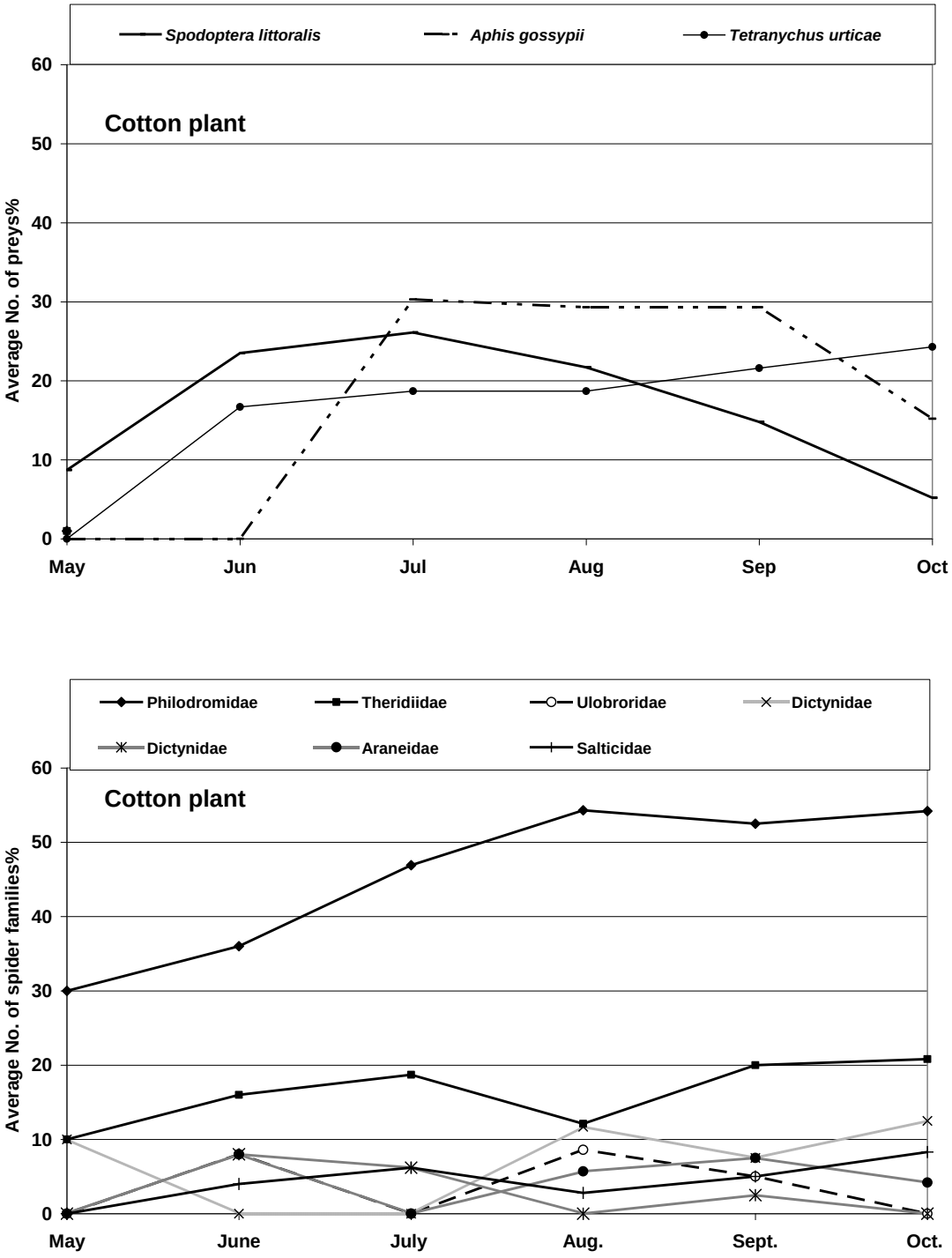


Fig. (22): Association of spider families and preys on cotton plants during (2003-2004) season at Seds station, Beni-Sueif Governorate.

in September and reached 52.5%. In case of, Family: Theridiidae the population density had four peaks, the two highest peaks were occurred in September and October with 20.0 and 20.8%, with the lowest peaks in May and August 10.0 and 12.1%, while the population densities of Families: Ulobroidae and Araneidae were relatively low during the season of cotton. But the population density of both Families: Thomisidae and Salticidae increased to reach 8.0 and 8.3 in June and October, respectively.

The population density of *T. urticae* gradually increased at the end of the season but the population of *A. gossypii* decreased monthly from July to October and reach 30.3, 29.3, 29.3 and 15.2%, respectively, in case of the population of *S. littoralis* had one highest peak in July and two lowest peaks in May and October, with 8.7 and 5.2%, respectively.

1.4.4. Association of spider families and preys on bread bean and cotton plants during (2004-2005) at Seds Station:

a) Broad bean:

Data in Table (17) and Fig. (23) show that the population density of Family: Philodromidae increase gradually to reach the highest peak at the end of the season, with 40.0%, while, of the Family: Theridiidae had its highest peak in March and reach to 20.0% but it disappeared in December until January, both the Families Ulobroidae and Dictynidae had four peaks, the highest were occurred in December and January with 15.4 and 15.7%, respectively and lowest were occurred in February and March, with 5.0 and 4.0%, respectively. The population density of the Families: Thomisidae and Salticidae were found during March and April in relatively low numbers.

The population density of *S. littoralis* gradually decreased by the end of the season, but it slowly increased in case of *T. urticae*, while *the* population density of *A. craccivora* had three peaks, the highest peak was

Table (17)

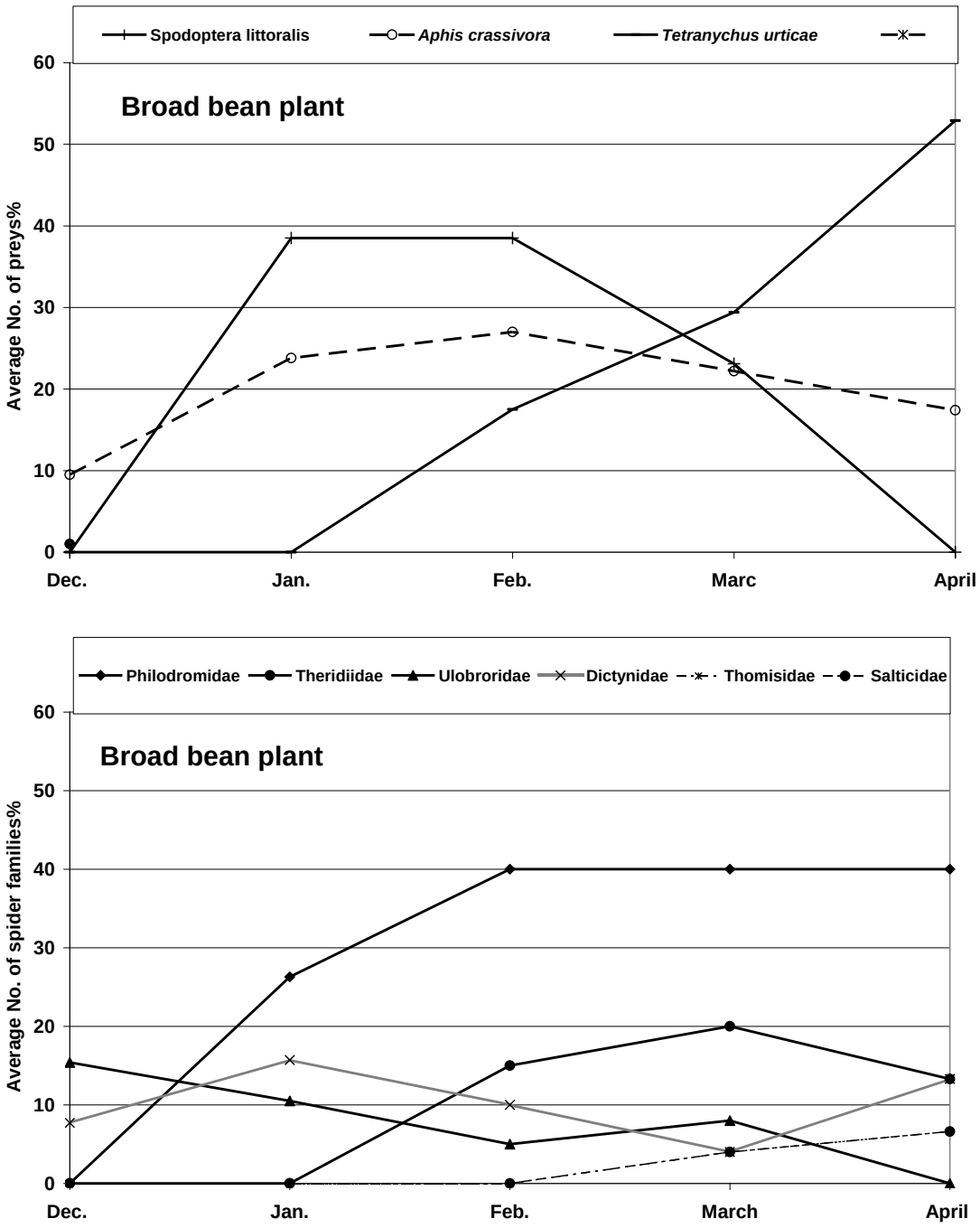


Fig. (23): Association of spider families and preys on broad bean plants during (2004-2005) at Seds station, Beni-Sueif Governorate.

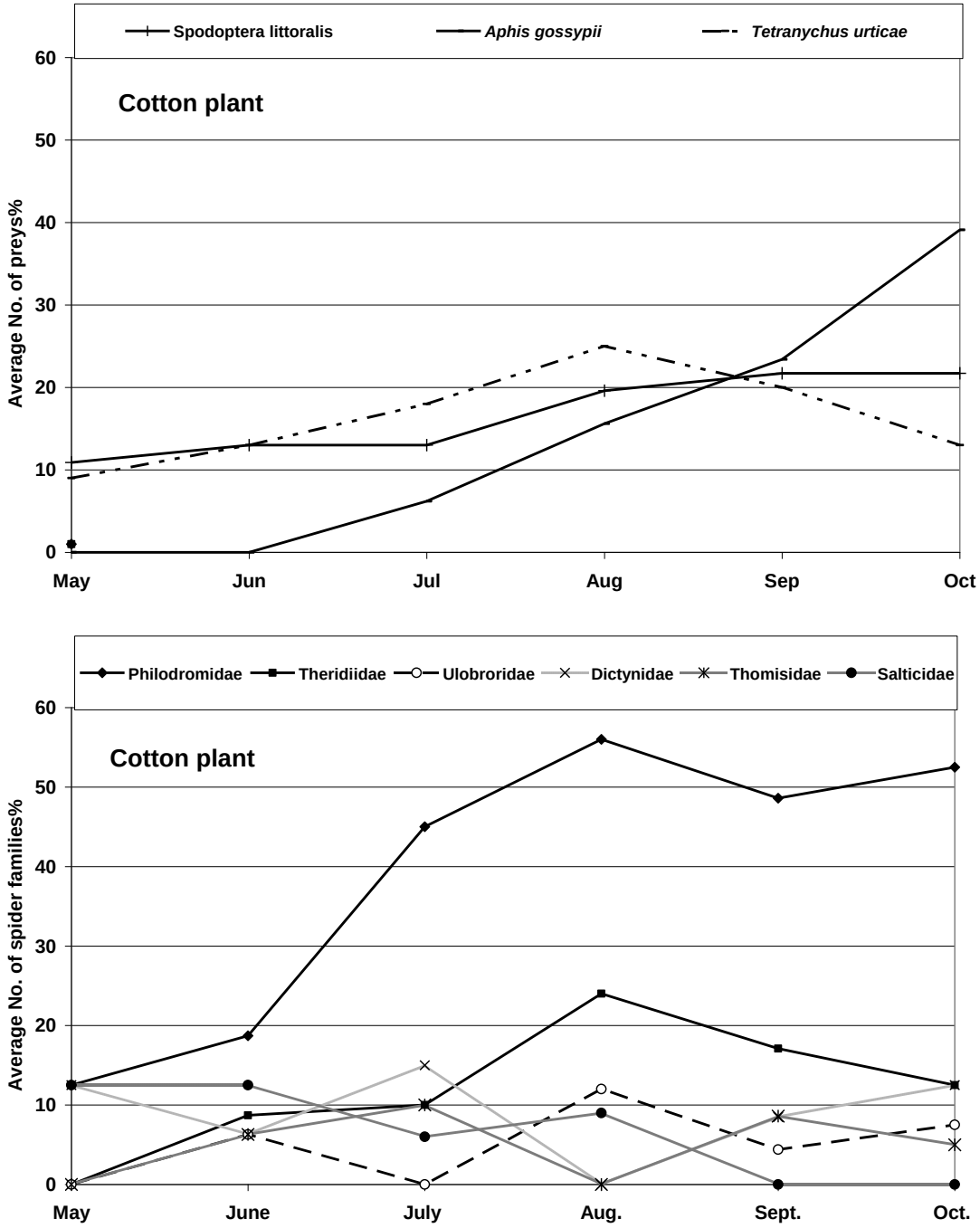


Fig. (24): Association of spider families and preys on cotton plants during (2004-2005) at Seds station, Beni-Sueif Governorate.

occurred in June, Feb. and March with 23.8, 27.0 and 22.2% and the lowest peak was occurred in December with 9.5%.

b) Cotton:

Data in the same table and Fig. (24) show that the population density of spider Families: Philodromidae, Theridiidae, Ulobroridae, Dictynidae, Thomisidae and Salticidae had two peaks, the highest peaks were 56.0, 24.0, 12.0, 15.0, 10.0 and 12.5%, respectively in August, August, August, July, July and June, respectively, while the lowest peaks were 12.5, 8.7, 4.4, 6.3, 5.0 and 6.0% in May, June, September, June, October and July, respectively.

The densities of preys (*S. littoralis* and *A. gossypii*) were relatively increased from May until October, respectively, while the population density of *T. urticae* had two peaks, the highest peak was occurred in August with 25% but the lowest peak was occurred in May with 9%.

Generally, seven families (Lycosidae, Philodromidae, Theridiidae, Ulobroridae, Dictynidae, Thomisidae and Salticidae) occurred in high numbers on broad bean and cotton fields in Qaha and Seds Stations, these families were found associated with the decreasing and increasing numbers of the three pests (*S. littoralis, A. gossypii, A. craccivora* and *T., urticae*) than others families. These results agreement with the results which obtained from Hussein *et al.* (1998) who recorded that the five families Araneidae, Lycosidae, Philodromidae, Salticidae and Theridiidae which occurred in all the surveyed locations.

1.5. Average number of spider predators and their families from broad bean and cotton plants during two successive years (2003-2004) and (2004-2005) at Qaha and Seds Stations:

Data represented in Table (18) and Figs (25&26) show that the average number of spider and their families individuals from broad bean plants during two successive years (2003-2004) and (2004-2005) at Qaha and Seds Stations.

The spider individuals gradually increased monthly from December until April in two seasons at two stations but it relatively increased in case Qaha Station more than Seds Station to reach (90, 105) and (72, 60) individuals until the end of the season.

a) In Qaha Station during two seasons:

The number of families increased to reach 8 families in March and decreased in April to reach 7 families at (2003-2004) season, while increased from December until April the second season (2004-2005).

b) In Seds Station:

The number of families increased to reach 7 families in Jan. and April and decreased to reach 4, 5 and 6 families in Dec., Feb. and March, respectively, while the number of families increased to reach 8 families in March at the second season and dropped to reach 3, 4, 5 and 6 families in Dec., Jan. Feb. and April, respectively.

Also, data represented in Table (19) and Fig. (27&28) indicated that the average number of spider and their families individuals from cotton plants during two successive years (2004) and (2005) at Qaha and Seds Stations.

Table (18)

Fig. (25)

Fig. (26)

Table (19)

Fig. (27)

Fig. (28)

The average numbers of spider increased monthly from May to Aug. (2004) at Qaha Station to reach 180 individuals and dropped in Sept. and Oct., while they gradually increased to reach 79 individuals at the end of season.

While in Seds Station, the average No. of spider increased monthly from May to Oct. during 2004, respectively, but they decreased to reach 65 individuals in August and dropped in Sept. and Oct. during (2005) season.

a) In Qaha Station:

The number of families increased to reach 7 and 8 families in May, June, July and Sept, respectively, and decreased to reach 6 families in August and Oct. (2003-2004) but in the second season (2004-2005) the average numbers of families were 9 and 8 families in May and July and decreased gradually in June, August, September and October, respectively.

b) In Seds Station:

The number of families increased from 4 to 7 families in May and June and decreased into 6 families at the end of the 1st season while at the second season they were 7 families in June and October, but decreased from 4 to 6 families in May, July, August and Sept., respectively.

These degrees were recorded with El-Erksowsy (2000) who registered some families at Beni-Sweif Governorate, during 1997, these families were Araneidae, Miturgatae, Lycosidae, Philodromidae, Salticidae, Dictynidae, Gnaphosidae, Linyphildae and Theriidae. Also all these families were recorded during 1998 survey except family Linphiidae.

2. Biological studies:

Biological study of *Thanatus albini* (Audouins) (F.: Philodromidae):

This species was found to occur in great numbers on broad bean and cotton plants at Kaha and Seds Stations at Qalubiya and Beni-Sueif Governorates. This study was conducted under laboratory conditions of 30±2°C and 70-80% RH. To notice the feeding behaviour we divided the spider's feeds into four groups.

First group (G_1): *S. littoralis, A. craccivora* and *T. urticae.*

Second group (G_2): *S. littoralis* and *A. craccivora.*

Third group (G_3): *S. littoralis* and *T. urticae.*

Forth group (G_4): *A. craccivora* and *T. urticae.*

2.1.Feeding behaviour:

When the spider feeds on living stages of preys it watches the prey, comes close and suddenly catches the prey from the anterior part of the body between its chelicerae, imbedding the chelicerae in the prey and then begins to suck its body fluids.

The feeding on the prey takes about 4 minutes. After swalling, the spider abdomen becomes inflected and the attacking spider usually rests for few minutes before attacking another prey. It was noticed that the predator spider use webbing to trap its prey only. All in matures stages (spider ling) were able to feed on known number of preys (*T. urticae*), *A. craccivora* and 1st and 2nd instar larvae of *S. littoralis.*

2.2. Moulting:

Generally, the moulting must be happen during the developmental stage according to the increasing in body size. When the spider ling grown. There is a resting period lasted for one to two hours before moulting, after this period the spiderling make a twisting movement and a longitudinal lateral split happen in the old integument along the two lateral sides of the body. Then the animal got rid of its old cuticle through

twisting movements to separated the old cuticle from the new cuticle, the spider withdraw its mouth parts and legs outside from the old cuticle the new spiderling crawling leaving the exuvia. Thus moulting proven happen, the individuals stopped moving about 40-50 minutes until the new integument dry then moving searching about its prey.

2.3. Mating:

The virgin female stayed feeding for an average of 8 days and male attack a large number of preys then the female stop feeding and walks close to the male making courtship movement then male ride on her back in the same direction, then turned him self to be his anterior facing the posterior portion of female. In this position the male caught the female with his legs, and then move his anterior region to face the ventral surface of the female and insert the right palpal organ in female genital opening. After a short time from the first mating, the male repeated the copulation with the same female using his left palpal organ.

2.4. Fecundity:

Fecundity of the *Thanatus albini* (Audouins) female as influenced by different prey at 30±2°C and 60-70% RH in Table (20 and Fig. 29).

Oviposition:

Adult female of the true spider species *T. albini* requires a pre oviposition period before depositing eggs they increased from G1 until G4 group. They were 10.8±0.4, 10.8±0.8, and 12.4±2.2, respectively and decreased at third group to reach 7.5±0.50.

Table (20)

Fig. (29)

Oviposition day:

The female preferred to deposit her eggs in groups inside an egg sac. The number of deposited egg sacs per mated female ranged from two to three with an average of 2.5 egg sacs during her oviposition period, which averaged 10.5±0.5, 10±0.7, 6.5±0.5 and 15.8±1.3 from G1 until G4, respectively. The female covered each egg sac with another layer of dense silky webbing and attached with wall of tube.

Post-oviposition period:

The post-oviposition periods were 32.8±2.2, 30.5±5.2, 26±3.7 to 38.8±2.5 from G1 to G4, respectively.

The numbers of egg in each egg sac were 44.3±18.6, 44.5±18.9, 48±18.7 and 26.3±7.4 from G1 to G4, respectively.

2.5.Spiderling development:

The eggs were yellowish in colour, almost spherical then became darker before hatching. The spiderling stayed together before getting out from the egg sac. The newly hatched spiderling did not feed for about 3 hours.

The male and female of *T. urticae* pass through seven and eight spiderling stages, respectively before reaching adult.

Data in Table (21) revealed that, the spiderling according different in groups of prey feeding.

Incubation period:

The incubation period were influenced by different groups of prey in Table (21 and Fig. 30). They were 16.5, 15.8, 11.3 and 22.8 days for female in case of G1, G2, G3 and G4, while were 15, 13.5, 10.5 and 20.8 days for male in case of G1, G2, G3 and G4, respectively.

Table (21): Duration of male and female stages (spiderling) of *T. albini* reared on *S. littoralis, A. craccivora* and *T. urticae* at 30±2°C and 70-80% RH.

Spiderling	G1		G2		G3		G4	
	♀	♂	♀	♂	♀	♂	♀	♂
Egg incubation	16.5±0.7	15.0±0.4	15.8±0.8	13.5±0.3	11.3±0.4	10.5±0.3	22.8±0.5	20.8±0.3
1st	8.8±0.4	8.8±0.4	8.8±0.4	8.8±0.4	8.3±0.4	8.3±0.4	9.8±0.4	9.5±0.5
2nd	7.5±0.5	7.8±0.4	8.8±0.4	8.8±0.4	8.0±0.7	7.0±0.7	15.3±0.4	12.3±0.4
3rd	5.3±0.4	5.3±0.4	5.5±0.5	5.3±0.4	5.8±0.4	6.3±0.4	10.3±0.4	9.8±0.4
4th	6.3±0.4	5.8±0.8	5.5±0.5	5.3±0.8	6.3±0.8	6.5±0.5	18.3±0.4	17.5±0.5
5th	9.8±0.4	9.3±0.8	8.3±0.4	8.0±0.0	6.8±0.4	6.3±0.4	14.3±0.3	13.3±0.5
6th	9.8±0.4	9.3±0.4	10.0±0.7	9.5±0.5	8.8±0.4	8.3±0.4	13.5±0.5	11.3±0.4
7th	11.3±0.4	10.5±0.5	10.0±0.0	9.5±0.5	8.5±0.5	7.8±0.4	19.0±0.7	18.3±0.4
Total immature	59.3±2.4	58.3±2.7	59.3±2.1	53.5±	46.5±3.2	45.5±3.2	98.3±3.1	94.5±3.0
Life cycle	76.3±3.9	73.3±4.1	75.1±3.7	67.0±3.3	57.8±4.0	55.8±3.5	121.1±3.6	115.3±3.3
Longevity	56.0±17.4	33.5±4.7	50.0±9.4	31.7±2.0	32.5±5.6	29.5±2.7	69.3±4.7	59.0±6.4

Fig. (30)

1st spiderling:

They were 8.8, 8.8 and 8.3 days for both female and male in G1, G2 and G3, respectively and 9.8 and 9.5 days for both female and male in case of G4, respectively.

2nd spiderling:

They ranged between 7.5 to 8.8 days for both female and male in G1, G2 and G3 but they different from 15.3 to 12.3 days for both female and male in case of G4, respectively.

3rd spiderling:

They ranged from 5.3 to 6.3 days for both female and male in G1 into G3 but they were 10.3 and 9.8 days for both female and male in case of G4, respectively.

4th spiderling:

The 4th spiderling ranged between 5.3 to 6.5 days for both female and male in the G_1, G_2 and G_3 groups but they were 18.3 and 17.5 days for both female and male in case of G4, respectively.

5th spiderling:

This spiderling lasted in high ranged in G1 and G4 group they were (9.8, 9.3) and (14.3, 13.3) days for both female and male, respectively. But in low ranged in G2 and G3 they were (8.3, 8) and (6.8, 6.3) days for both female and male, respectively.

6th spiderling:

The 6th spiderling lasted from (9.8 to 9.3) and (10.o to 9.5) days in case of G1 and G2 for both female and male but increased to reach 13.5 and 11.3 days for both female and male, respectively in case of G4, but they recorded 8.8 and 8.3 days for both female and male at G3, respectively.

7th spiderling:

This spiderling lasted from (11.3 to 10.5) and (10 to 9.5) days in case of G_1 and G_2 for both female and male but they dropped to reach 8.5 and 7.8 days for both female and male, in case of G_3, respectively, and reached to 19 and 18.3 days for female and male in case of G4, respectively.

The total immature period:

Data in Table (21 & Fig. 30) show that the total period of spiderlings development (immature) different according to groups for both female and male, its reached from (59.3 to 58.3) and (59.3 to 53.5) days for both female and male from G1 to G2 and dropped in case of G3 they were 46.5 and 45.5 days for female and male, respectively. The duration increased in case of G4, it reached 98.3 and 94.5 days for both female and male, respectively. Thus, the highest life cycle at G4 averaged 121.1 and 115.3 days for female and male, respectively, and the lowest life cycle at G_3 averaged 57.8 and 55.8 for female and male, respectively.

Longevity:

Longevity of female was longer than in male, they were 56, 50, 32.5 and 69.3 days for G1, G2, G3 and G4, respectively, while they ranged from 33.5, 31.7, 29.5 and 59.0 days for male in case of G1, G2, G3 and G4, respectively.

Food consumption:

The results of predation capacity are represented in Table (22 & 31). The rate of consumption increased gradually according to the age of spiderling and the adult was the most efficient stage. *T. urticae* was offered as a prey for 1st, 2nd and 3rd spiderling in case of G1, G3 and G4.

- The 1st, 2nd and 3rd spiderling attacked the motile stages of Tetranychid mite from the anterior part of the body and turn the prey move than ones before sucking its body fluid.
- The 1st to 7th spiderling of the spider attached to adult stages of Aphids from the membranes region between head and thorax or thorax and abdomen, then absorbed the body fluid, in case of *S. littoralis* the spiderlings of spider attacked the larvae from any part of the body then sucked the body fluid.

1. First group (G1):

The rates of food consumption by 1st spiderling were 31.8, 43.8 and 73.8 prey individuals for the *S. littoralis, A. craccivora* and *T. urticae*, respectively. The ratio of food consumption increased to reach into 388.3, 590 and 336 prey individuals of the *S. littoralis, A. craccivora* and *T. urticae* for total immature spiderling.

2. Second group (G2):

These spiderling consumption 31.8 and 43.8 individuals from *S. littoralis* and *A. craccivora* through this period while the total rate increased gradually to reach 462.8 and 633.5 individuals by all spiderling stages.

3. Third group (G3):

1st, 2nd and 3rd spiderlings fed on *S. littoralis* and *T. urticae* to reach 73 and 125 individuals while from 4th spiderling into 7th spiderling fed on *S. littoralis* only. The total rate of food consumption which occurred by

all spiderling were 587.5 and 288.5 individuals for *S. littoralis* and *T. urticae*, respectively at the end of immature spiderling.

4. Fourth group (G4):

From 1st, 2nd into 3rd spiderling fed on *A. craccivora* and *T. urticae* to reach 87.5 and 152.3 at the 3rd spidrling, respectively. The food consumption by all spiderling gradually increased to reach 1095.8 and 349.3 individuals for *A. craccivora* and *T. urticae,* respectively.

From the above mentioned results it clears that:

1. The males of this spider species were developed faster and smaller than the females. This study is in the same line of El-Erksousy and Fawzy (2001) they studied the biological aspects of the spider *Thomisus spinifer* on the Mediterranean fruit fly, *Ceratitis capitata,* at 26°C in Egypt. Data proved that female spider went through 8 spiderlings before reaching maturity, while male spiders went through 7 spiderlings. The life cycle required 198.7 and 165.4 days for female and male spider, respectively.
2. The total duration of male and female of *Thanatus albini* (Audouin) life cycle (egg + immature) was depended on high temperature (30±2) and RH (70-80%) and kind of food group. This result does not agree with that of El-Erksousy *et al.* (2002) they reared this species on aphid, *Schizaphis graminum,* they indicated that the period of life cycle of spider was 169.87±5.25 and 148.73±3.37 under laboratory condition 26°C and 60-70% RH. Abdel-Rahman *et al.* (2001) they indicated that female and male of the true spider *T. albini* went through (7-8) spiderlings with developmental period, 129.4±17.94 and 105.17±9.54, respectively, and the average total numbers of consumed prey for female and male spiderlings average 1206.4±123.44 and 620.97±302.23 prey, respectively, of 1st instar of *S. littoralis* and 695.0±69.63 individulas prey of *T. urticae* for 2nd spiderlings.

Table (22): Food consumption of *T. albini* feeding on *S. littoralis, A. craccivora* and *T. urticae* at 30±2°C and 70-80% RH.

Spiderling	G_1			G_2			G_3			G_4		
	Sl1	Ap1	Tu1	Sl1	Ap2	Tu2	S3	Ap3	Tu3	Sl4	Ap4	Tu4
1st	31.8 ±2.0	43.8 ±1.2	73.8 ±1.3	31.8 ±2	43.8 ±1.8		32.5 ±1.8		62.3 ±2.3		43.3 ±2.2	75.5 ±2.9
2nd	41.5 ±1.1	53.3 ±2.4	126.3 ±6.5	41 ±1	63.5 ±2.7		62.8 ±2.3		101.3 ±2.1		64.5 ±2.7	121.5 ±2.1
3rd	42.5 ±1.8	52.5 ±1.9	136.5 ±4.5	63 ±2.1	90.8 ±0.8		73 ±3.5		125 ±3.5		87.5 ±5.6	152.3 ±2.3
4th	43.3 ±2.0	73.0 ±2.1		70.8 ±0.8	104.8 ±4.8		71.5 ±1.7				126 ±3.9	
5th	62.5 ±1.8	106.3 ±7.6		72 ±1.2	98.5 ±1.5		83 ±2.1				188.8 ±7.4	
6th	79.8 ±3.6	124.3 ±3.8		82.5 ±2.5	108.3 ±1.9		122 ±2.1				232 ±4.3	
7th	87.5 ±2.5	136.5 ±8.0		97.3 ±1.8	124 ±3.9		141.3 ±4.1				353.8 ±29	
Total	388.3 ±7.7	590 ±13.1	336.5 ±9.4	462.8 ±5.1	633.5 ±3.5		587.5 ±10.3		288.5 ±5.4		1095.8 ±50.4	349.3 ±3.1

SL* : *Spodoptera littoralis
Ap: Aphis craccivora
Tu: Tetranychus urticae

Fig. (31)

3. Toxicity of some alternative pesticides on adults (females and male):

The experiments were conducted to know the effect of alternative pesticides as local Petroleum Oil KZ 95% EC, Vertimec 1.8% EC and plant extract *Piper nigrum* 10% in acetone, which are used in controlling these pests *S. littoralis, Aphis craccivora* and *T. urticae*.

1. Effect of three pesticides on spiders (females and male), (mortality and duration).

Data in Table (23) and Fig. (32) showed that the mortality of individuals are considerably low in plant extract after 24h where it was 3.3% and 3.0% for both of females and male, respectively and gradually decreasing after 48 h and 72 h, respectively.

Vertimec was slightly more toxic to spider females and males after 24h it were 6.6 and 6.6%, respectively, but the effect of KZ oil, but the effect was decreased after 48 and 72 h, respectively in two applications.

Also data showed in Table (24) and Fig. (33) the effect of three alternative pesticides on the duration of females and males of *T. urticae.* It was concluded that KZ oil more effect on duration of females and males of spider it was 21.5 and 19.3 days, respectively. On the other hand, the effect of Vertimec on duration of females and males was considerably increased than *P. nigrum* extract it was 27, 23.3 days and 33, 32 days, respectively, for females and male.

Table (23): Effect of three alternative pesticides on the mortality percentage of female and male of *T. albini* after 24, 48 and 72h.

Mortality% after	24 h.		48 h.		72 h.	
Treatment	♀	♂	♀	♂	♀	♂
KZ oil	3.6	3.3	1.3	1.0	1.0	0.7
Vertimec	6.6	6.6	1.5	1.3	1.3	1.0
Piper nigrum	3.3	3.0	0.7	1.0	0.5	0.7
Control	2.0	1.0	2.0	1.0	1.0	1.0

Fig. (32)

Table (24): Effect of three alternative pesticides on the duration of female and male of *T. albini*.

No. of treatment	Duration	
Kind of spider	♀	♂
KZ oil	20 25 20 21	20 21 19 17
Average	21.5	19.3
Vertimec	35 25 20 28	20 21 19 17
Average	27.0	23.3
Piper nigrum	33 32 33 34	32 32 33 31
Average	33.0	32.0

Fig. (33)

Finally it can be concluded that plant extract *(P.nigrum)* are apparently safe to spiders. They can be used in the IPM prtogramms safely. On the other hand KZoil and Vertimec cause low effect on mortality percentages and duration of female and male of spider adults. These results are in agreement with Mansour and Nentwing (1988) and Sallam (2002) who mentioned that the effect of the mineral oil KZ oil had moderately harmful (50-75%) on the population density of spiders, also mentioned that fungcides were low toxic to true spiders.

4. Biochemical study to investigate the effect of nutrition and alternative pesticide on total protein and protein bands in adult spiders.

4.1. Total protein content:

Colorimetric determination of the total protein content of adult which effected by three alternative pesticides (KZ oil 95% EC, Vertimec 1.8% EC and *P. nigrum* 10% acetone). Table (25) and Fig. (34) showed that the protein concentration of adults' which treated with *P. nigrum* was lower than in the tissue of adult which treated with KZ oil, Vertimec and control, they were 14.1, 24.0, 24.6 and 29.0%, respectively. Table (26) and Fig. (35) revealed that the protein concentration in body tissue of adults' in G3 was much higher than that in the G1, they were 74.1%, while the lowest concentration of protein in G4 was 15.8%.

The obtained data indicated that KZ oil and G4 had inhibition effect on the total protein except G3 and *P. nigrum* which clarify stimulation effect on spiders, these results coincide with those of Abou El-Ela *et al.* (1995), Abo El-Ghare *et al.* (1995), Schmidt *et al.* (1998), Shaurub *et al.* (1998), El-Bokl *et al.* (1998), they found that, protein are the most complex and the same time the characteristic of living matter, they are present in all viable cells; they are the compounds which as nucleoproteins, are essential to the process of cell division and as enzymes and hormones, control many chemical reactions in the metabolism of cells thus, the inhibition of protein can explain some other experimental results such as reduction in weight, slow development, tissue degradation and preventing adult emergence.

4.2. Refraction of protein patterns:

SDS-PAGE revealed that the proteins of tissue of treated samples and three feeding group.

Table (25): Total protein content (mg/gm) tissue of the body of *T. albini* which treated with three alternative pesticides.

Band No.	KZ oil	Vertemic	*P. nigrum*	Control
Conc. mg/gm tissue	24.0	24.6	14.1	29.0

Table (26): Total protein content (mg/gm) tissue of the body of *T. albini* which feeding on different groups.

Band No.	First group	Third group	Fourth group
Conc. mg/gm tissue	24.1	74.1	15.8

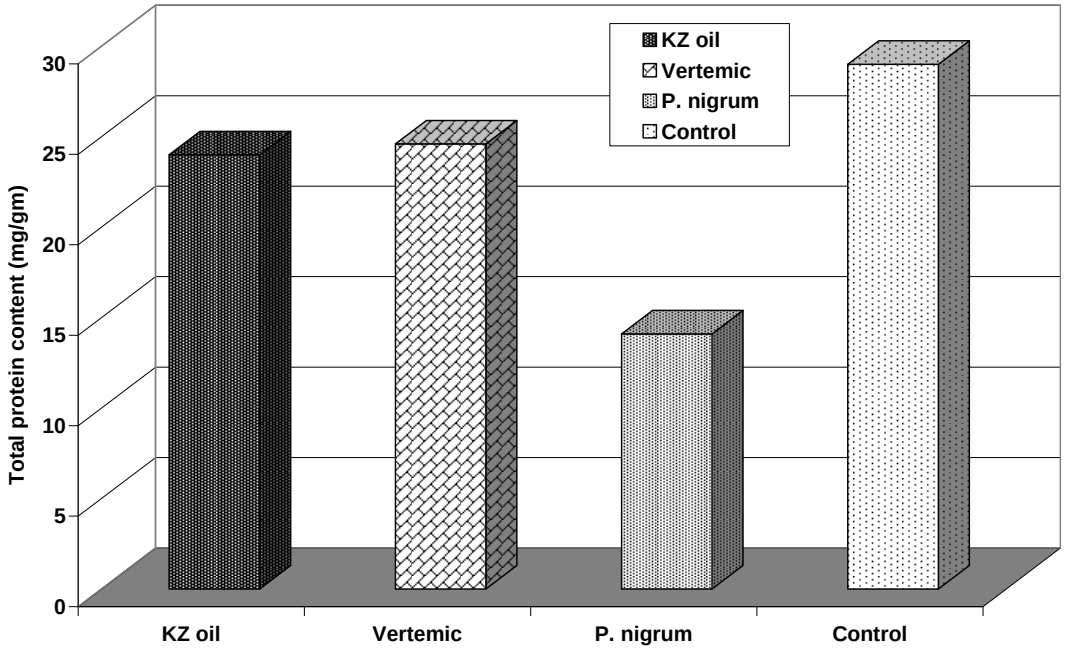


Fig. (34): Total protein content (mg/gm) tissue of the body of *T. albini* which treated with three alternative pesticides.

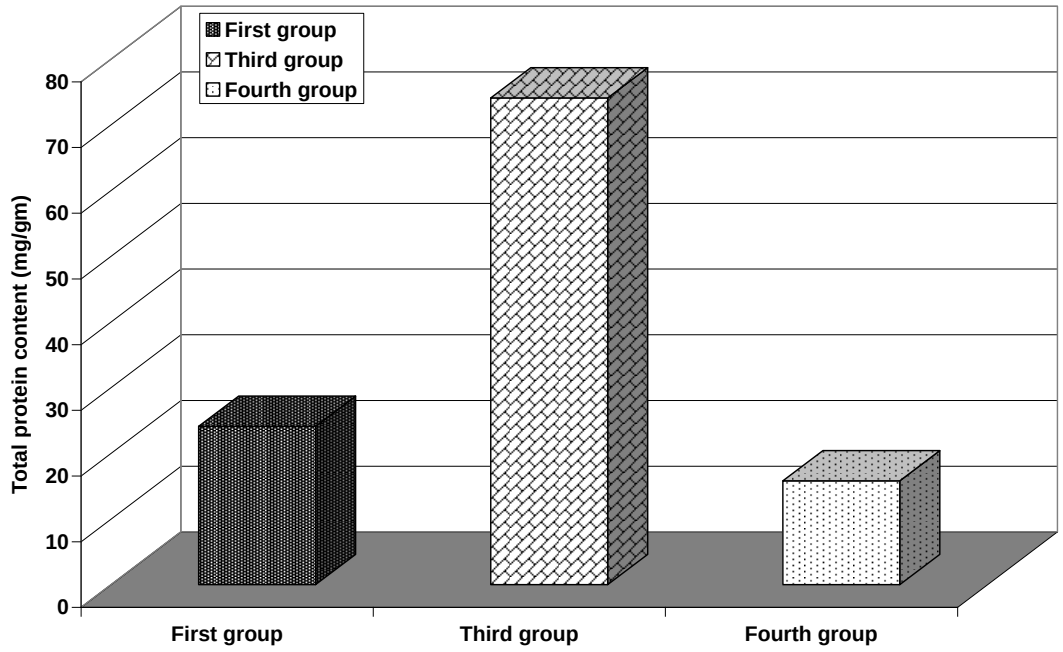


Fig. (35): Total protein content (mg/gm) tissue of the body of *T. albini* which feeding on different groups.

4.2.1. The effect of treated the adult of (*T. abini*) with alternative pesticides on its protein bands molecular weight:

The protein of tissue of control and three treated samples separated into 34 different bands and revealed by using Cobb strain. There were many clear differences between the protein of treated individual tissue and control in Table (27) and Figs 36, 40, 41, 42 and 43 showed that, the total numbers of bands in [1 control, 2 KZ oil, 3 Vertimiec and 4 *P. nigrum*], were 15, 11, 10 and 25, respectively. Two commons bands appeared in different samples. These bands are no. 8 and 31 with MW (133.33, 129.79, 131.37 and 130.87) and (37.74, 38.61, 40.07 and 39.22), respectively.

On the other hand, bands 3rd and 7th were detected only in treated with KZ oil with MW (126.84 and 67.85), respectively. Nine proteins (No. 2, 3, 4, 6, 7, 12, 15, 23, 27 and 29 with MW 168.02, 162.10, 152.83, 140.01, 134.49, 101.06, 93.25, 60.26, 48.72 and 42.50) were found in treated with *P. nigrum,* (4) two proteins (No. 5th and 10th) with MW 95.76 and 34.38 were detected in treated with Vertimec.

4.2.2. Molecular weight of protein bands for adult (*T. abini*) which feeding on different groups:

Data presented in Table (28) and Figs (37, 40, 44, and 45) showed that, the total number of bands in different feeding groups G1, G3 and G4 were 15, 18 and 18, respectively. Eight common bands appeared in different samples. These bands are No. 10, 11, 16, 18, 22, 25, 31 and 34 with MW (111.56, 111.65, 110.50); (108.40, 108.27, 106.41); (88.90, 86.54, 89.39); 78.11, 77.19, 75.11); (62.96, 63.17, 62.64); (53.14, 53.15, 53.17); (37.74, 38.79, 37.91) and (33.94, 34.06, 33.80), respectively.

Table (26): Molecular weight (MW) and relative front (Rf) of protein bands for adults *(T. albini)* which treated with alternative pesticides.

Band No.	MW maker	Rf	MW Control (1)	Rf	MW KZ oil (2)	Rf	MW Vertimec (3)	Rf	MW *P. nigrum* (4)	Rf
1	-	-	171.95	0.07	-	-	-	-	170.70	0.07
2	-	-	-	-	-	-	-	-	168.02	0.08
3	-	-	-	-	-	-	-	-	162.10	0.10
4	-	-	-	-	-	-	-	-	152.83	0.33
5	-	-	-	-	148.16	0.15	-	-	147.02	0.15
6	-	-	-	-	-	-	-	-	140.01	0.18
7	-	-	-	-	-	-	-	-	134.49	0.20
8	-	-	133.33	0.21	129.79	0.23	131.37	0.21	130.87	0.21
9	-	-	-	-	126.84	0.23	-	-	-	-
10	116.00	0.38	111.56	0.31	112.57	0.30	110.97	0.31	-	-
11	-	-	108.40	0.33	-	-	109.23	0.32	107.49	0.33
12	-	-	-	-	-	-	-	-	101.06	0.36
13	-	-	98.74	0.38	-	-	99.11	0.37	97.35	0.38
14	-	-	-	-	-	-	95.76	0.39	-	-
15	-	-	-	-	-	-	-	-	93.25	0.40
16	-	-	88.90	0.43	-	-	88.77	0.43	88.04	0.43
17	-	-	83.69	0.47	-	-	84.07	0.46	84.21	0.46
18	97.18	0.51	78.11	0.50	73.86	0.53	-	-	78.03	0.50
19	-	-	71.86	0.54	70.03	0.56	-	-	-	-
20	66.41	0.58	-	-	67.85	0.58	-	-	68.28	0.57
21	-	-	65.55	0.59	-	-	-	-	65.58	0.59
22	-	-	62.96	0.61	62.24	0.62	-	-	62.91	0.62
23	45.00	0.64	-	-	-	-	-	-	60.26	0.64
24	-	-	-	-	-	-	-	-	-	-
25	-	-	53.14	0.70	-	-	-	-	53.41	0.70
26	-	-	-	-	50.74	0.72	-	-	51.60	0.72
27	-	-	-	-	-	-	-	-	48.72	0.75
28	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	42.50	0.82
30	-	-	-	-	-	-	-	-	-	-
31	-	-	37.74	0.87	38.61	0.86	40.07	0.85	39.22	0.86
32	-	-	35.28	0.90	-	-	35.99	0.90	35.62	0.90
33	-	-	-	-	-	-	34.38	0.92	-	-
34	36.49	0.94	33.94	0.93	34.17	0.93	-	-	-	-
Total bands	**5**		**15**		**11**		**10**		**25**	

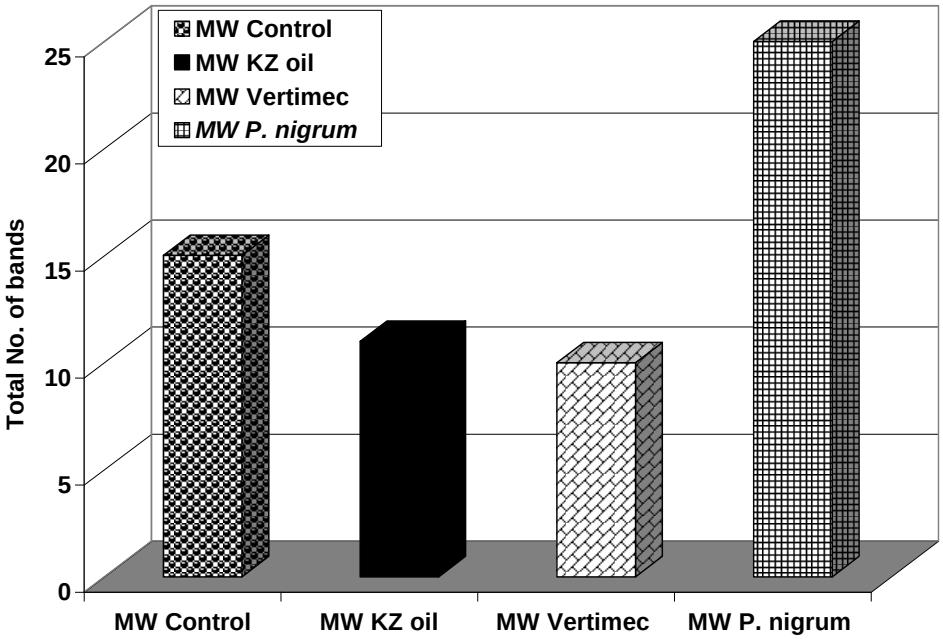


Fig. (36): Total No. of protein bands for adult of *(T. albini)* F.: Philodromidae which treated with alternative pesticides.

Table (28): Molecular weight (MW) and relative front (Rf) of protein bands for adults *(T. abini)* which feeding on different groups.

Band No.	MW market	Rf	MW G1	Rf	MW G3	Rf	MW G4	Rf
1	-	-	171.95	0.07	-	-	-	-
2	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-
8	-	-	133.33	0.21	-	-	-	-
9	-	-	-	-	-	-	-	-
10	116.00	0.38	111.56	0.31	111.65	0.31	110.50	0.31
11	-	-	108.40	0.33	108.27	0.32	106.41	0.33
12	-	-	-	-	-	-	-	-
13	-	-	98.74	0.38	-	-	98.53	0.37
14	-	-	-	-	94.90	0.39	94.19	0.39
15	-	-	-	-	93.29	0.40	-	-
16	-	-	88.90	0.43	86.54	0.44	89.39	0.42
17	-	-	83.69	0.46	-	-	80.99	0.48
18	97.18	0.51	78.11	0.50	77.19	0.51	75.11	0.52
19	-	-	71.86	0.54	-	-	70.87	0.56
20	66.41	0.58	-	-	68.37	0.57	68.64	0.57
21	-	-	65.55	0.59	65.72	0.59	-	-
22	-	-	62.96	0.61	63.17	0.61	62.64	0.62
23	45.00	0.63	-	-	61.44	0.63	-	-
24	-	-	-	-	56.86	0.67	57.25	0.66
25	-	-	53.14	0.70	53.15	0.69	53.17	0.69
26	-	-	-	-	50.64	0.72	50.97	0.72
27	-	-	-	-	-	-	47.61	0.75
28	-	-	-	-	45.51	0.78	43.57	0.79
29	-	-	-	-	41.68	0.82	-	-
30	-	-	-	-	39.88	0.84	-	-
31	-	-	37.74	0.87	38.79	0.85	37.91	0.86
32	-	-	35.28	0.91	-	-	-	-
33	-	-	-	-	-	-	34.80	0.92
34	36.49	0.94	33.94	0.93	34.06	0.93	33.80	0.93
35	-	-	-	-	-	-	-	-
Total bands	**5**		**15**		**18**		**18**	

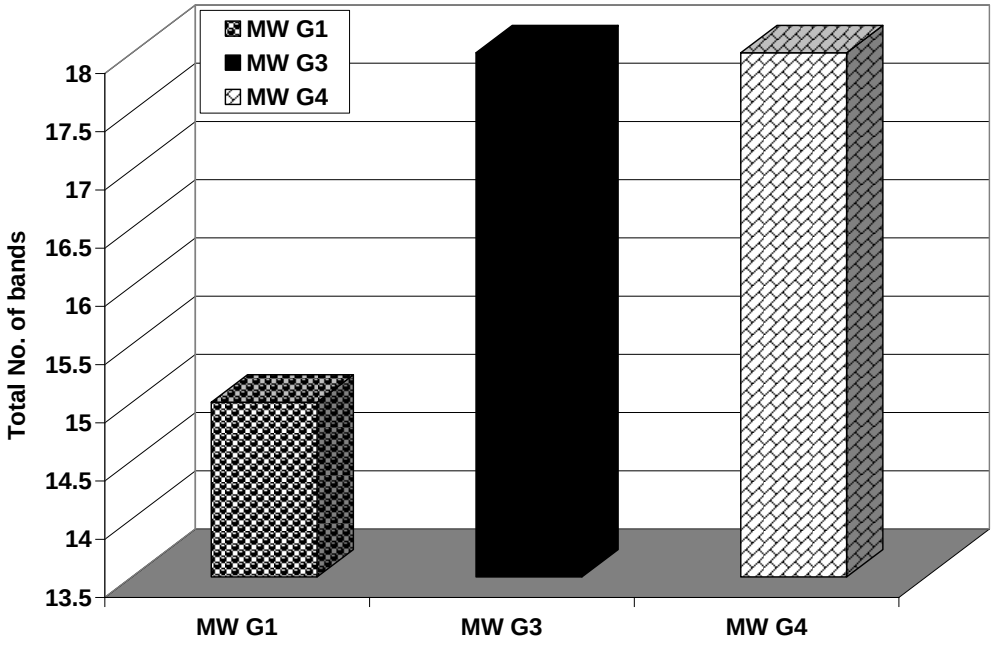


Fig. (37): Total No. of protein bands for adults of *T. abini* F.: Philodromidae which feeding on three groups.

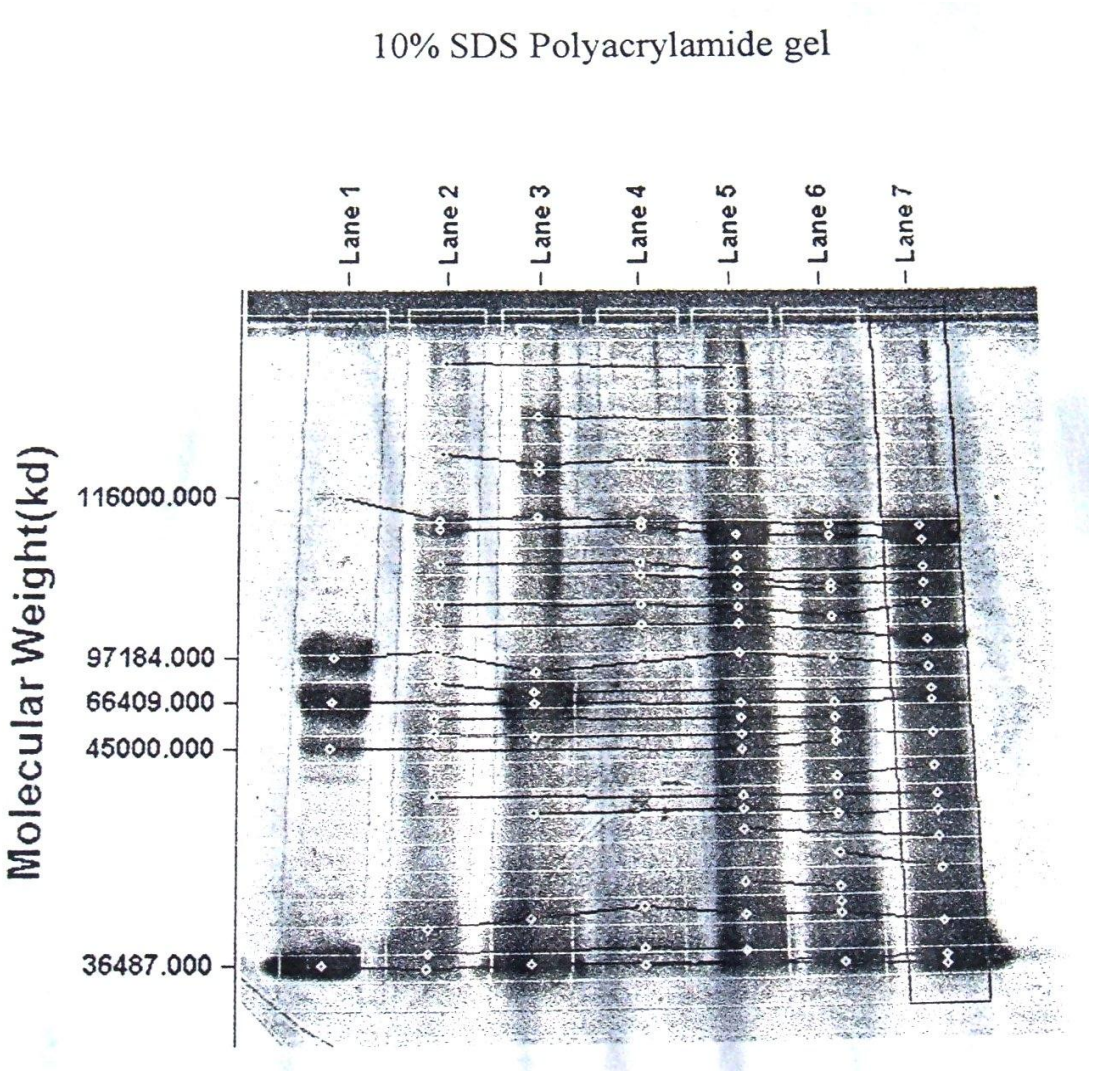


Fig. (38): Polyacrylamide gel of SDS protein pattern in body of spider *(T. albini*)

Lane 2 : Hall body which feeding on G_1

Lane 3: Hall body which treated with KZ oil

Lane 4: Hall body which treated with Vertimec

Lane 5: Hall body which treated with *P. nigrum*.

Lane 6: Hall body which feeding on G_3

Lane 7: Hall body which feeding on G_4

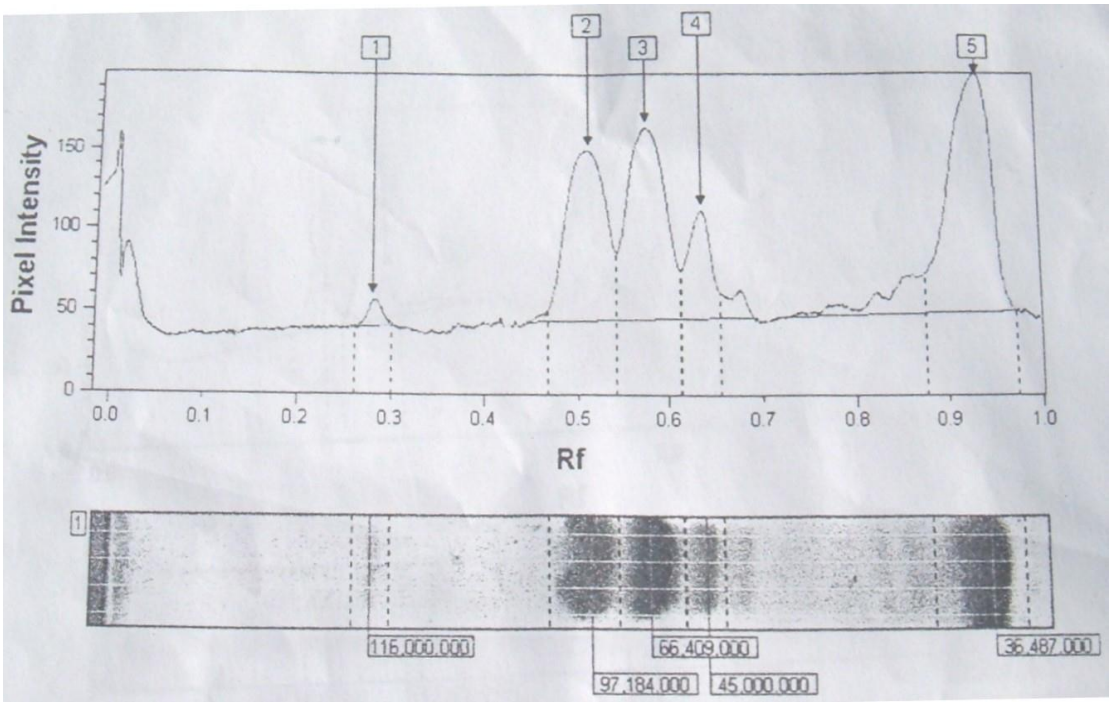


Fig. (39): Spectrophotometric scanning of standard MW protein.

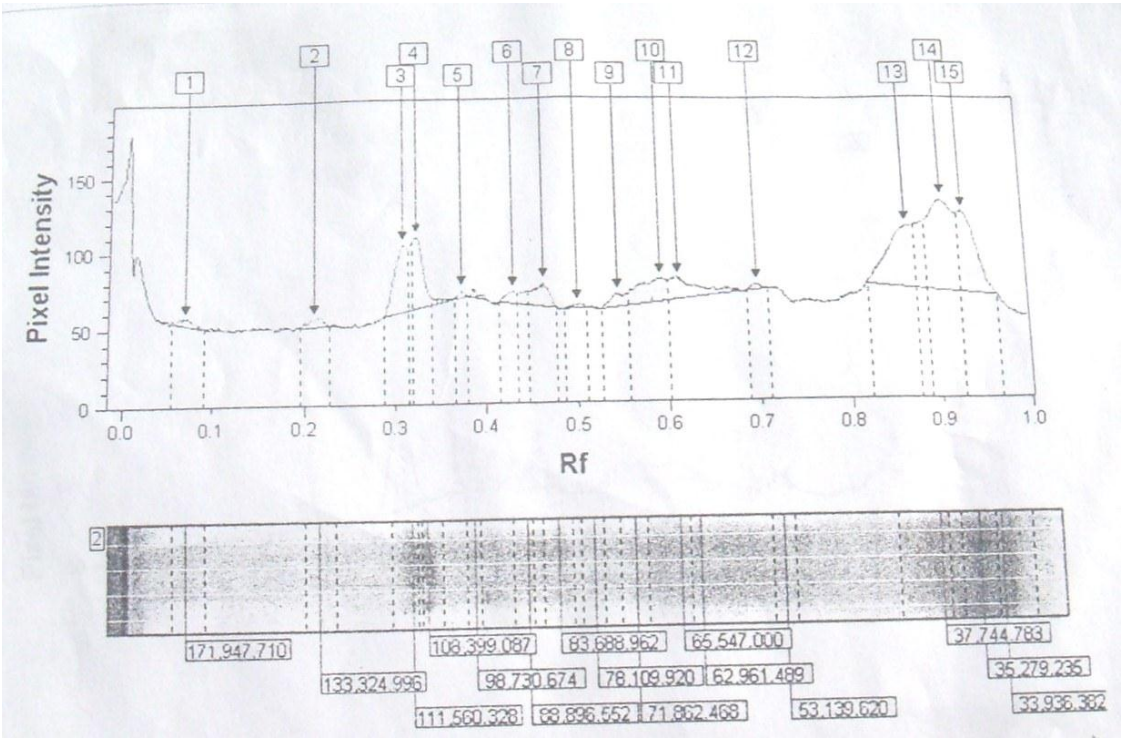


Fig. (40): Spectrophotometric scanning of total protein adult of spider *(T. albini*) F. : Philodromidae which feeding on G_1 (control).

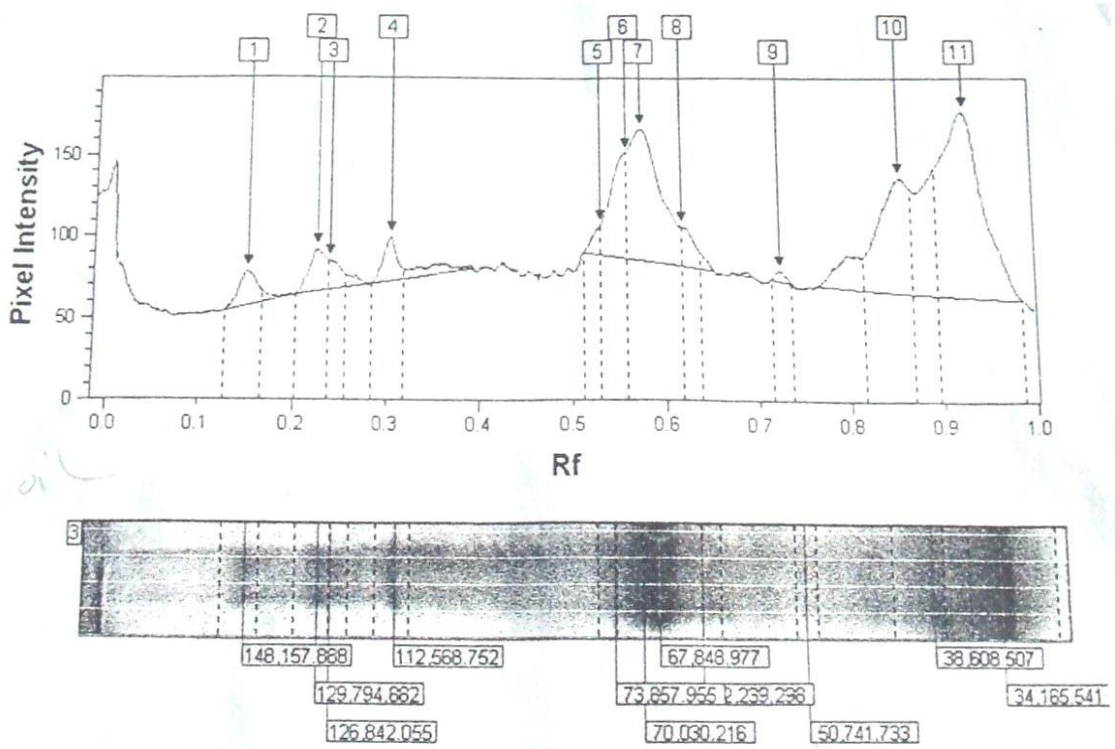


Fig. (41): Spectrophotometric scanning of total protein adult of spider *(T. albini*) F. : Philodromidae which treated with KZ oil.

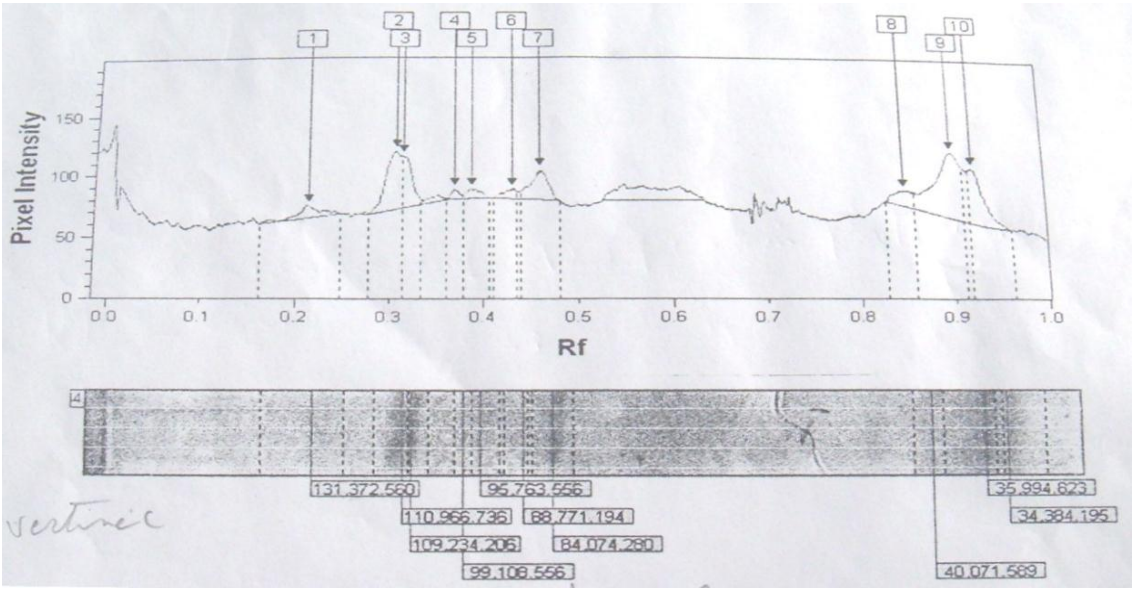


Fig. (42): Spectrophotometric scanning of total protein adult of spider *(T. albini*) F. : Philodromidae which treated with Vertimec.

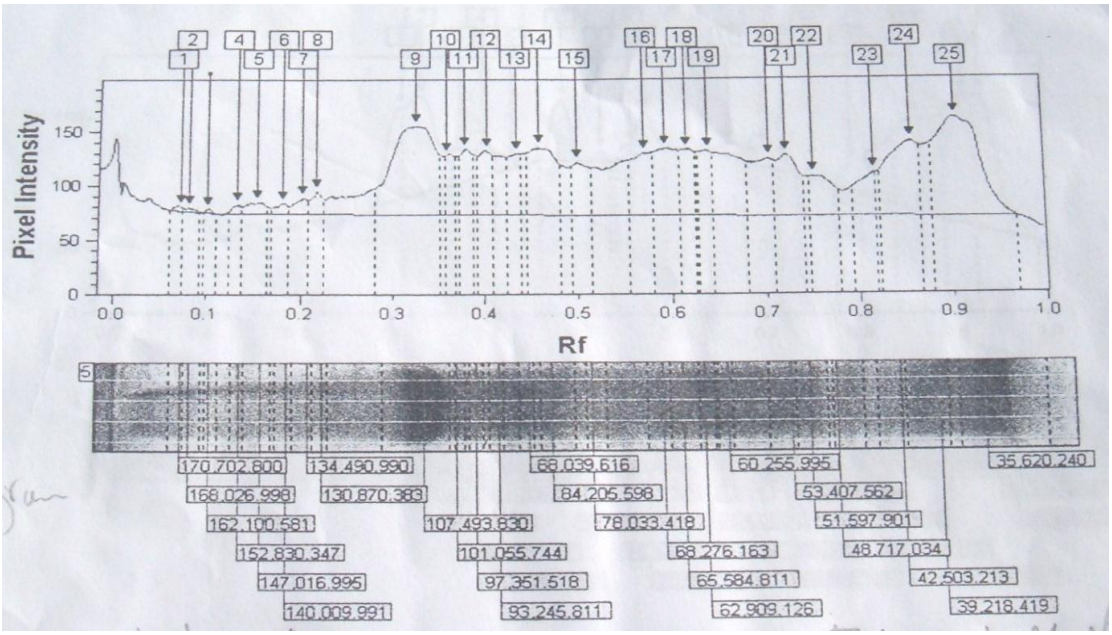


Fig. (43): Spectrophotometric scanning of total protein adult of spider *(T. albini*) F. : Philodromidae which treated with *P. nigrum*.

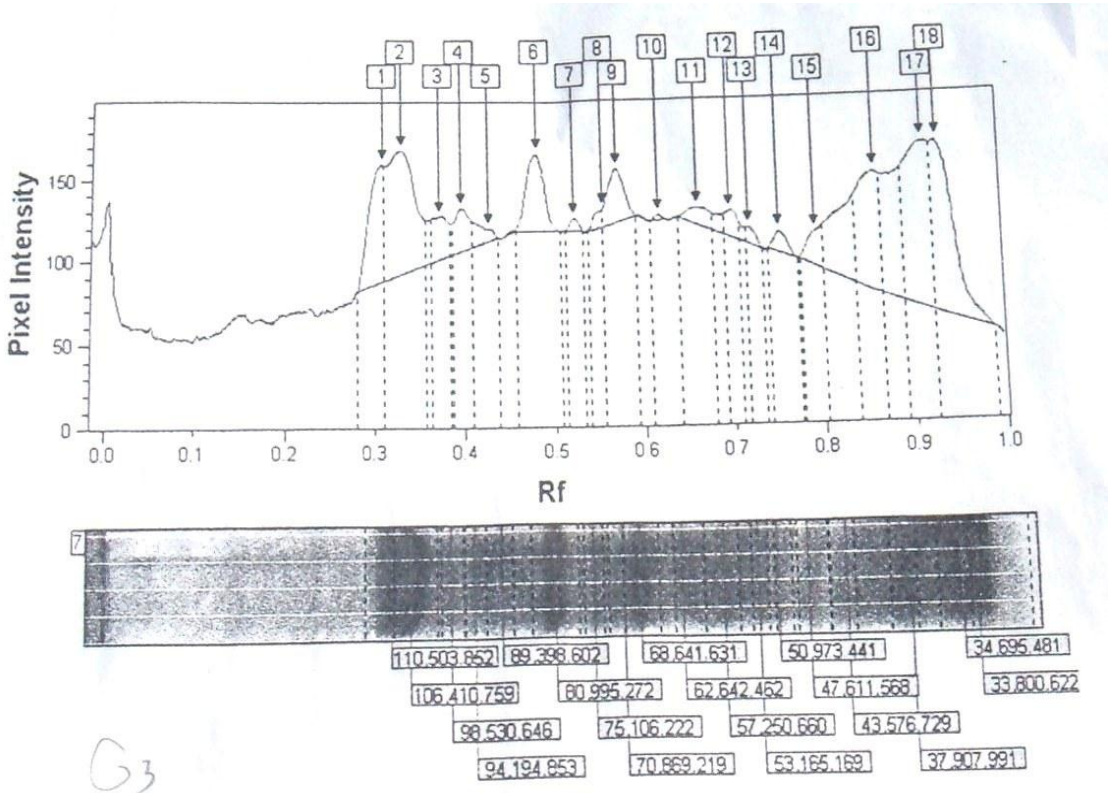


Fig. (44): Spectrophotometric scanning of total protein adult of spider *(T. albini*) F. : Philodromidae which feeding on G_3.

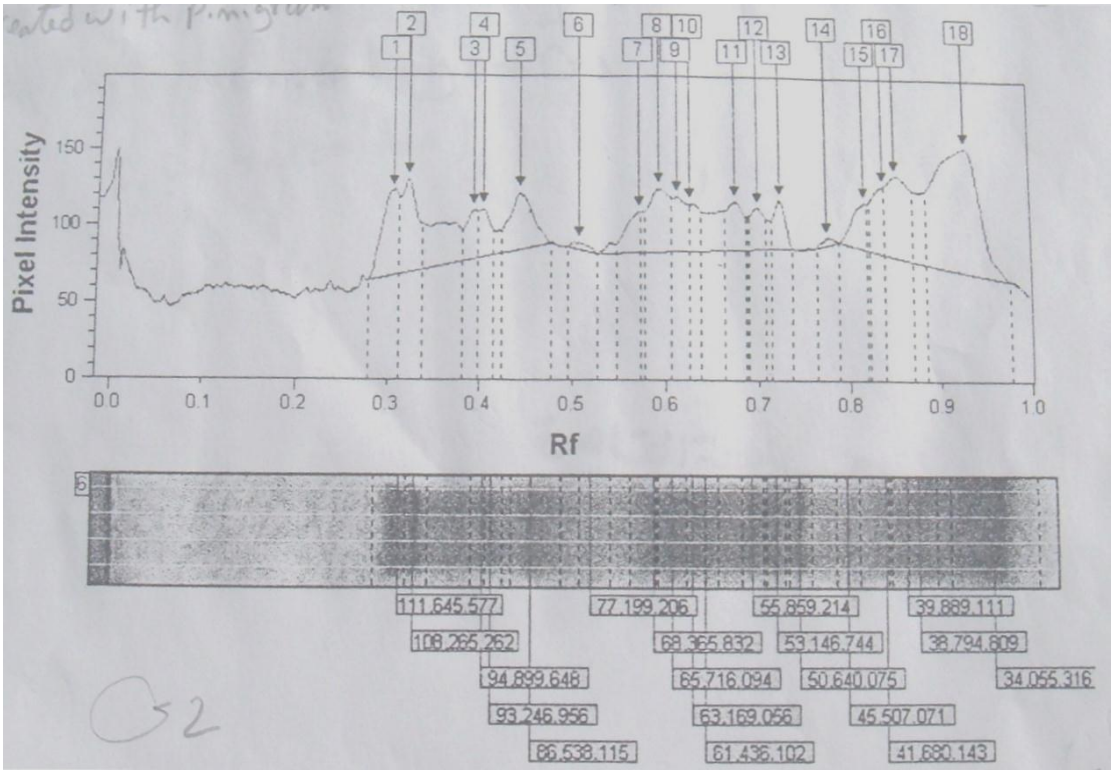


Fig. (45): Spectrophotometric scanning of total protein adult of spider *(T. albini*) F. : Philodromidae which feeding on G_4.

In addition, the band No. 1, 8 and 32 characteristics bands of G1 with MW 171.95, 133.33 and 35.28, respectively. On the other hand, bands No. 13, 17 and 19 appeared in G1 and G4 with MW (98.74, 98.53); (83.69, 80.99) and (71.86, 70.11), respectively and bands No. 15, 23, 29 and 30 were characteristic for G3 with MW 93.29, 61.44, 41.68 and 39.88, respectively and 27, and 33 appeared only in G3 with MW 47.61 and 34.80, respectively, while five common proteins subunits (No. 14, 20, 24, 26 and 28 with MW (94.90, 94.19); (68.37, 68.64); (56.86, 57.25); (50.64, 50.97) and (45.51, 43.57), respectively.

The results revealed that concentration of the whole body tissue protein bands were increased in treated with *P. nigrum* extract, G3 and G4 than control adults. They were 25, 18, 18 and 15, respectively, but this concentration decreased in adult which treated with KZ oil and Vertimec they were 11 and 10 bands, respectively.

These results indicated to important role of the studied the effect of protein extract and different feeding on adult protein these finding are in agreement with that obtained by Hassan (2002) who indicated that the protein electrophoresis revealed differences between the control and the other tested samples. The botanical extracts used create a great difference between control and other tested samples. That in due to the production of different types of proteins responsible for all the produced characters as sterility, low ratio of laid eggs which reflect the inhibition or activation of some genes responsible for this variance.