RESULTS AND DISCUSSION

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I. Seasonal fluctuation in population of the purple scale insect, *Cornuaspis beckii*, infesting Wachington citrus trees and factors effecting on it :

Half- monthly counts of different stages of ***C. beckii*** on citrus trees at Shobra Hares Kaha throughout two successive years (from March1994 to March 1996) are presented in Table (1.A). Also, means of half- monthly records of temperature and relative humidity throughout the two years are demonstrated in the same Table.

I.1.Preadults stages (N1+N2):

Concerning the preadults of the purple scale insect, ***Cornuaspis beckii*** in the first year of investigation, five peaks of the preadult stage abundance could be detected in the second week of April, second week of August, late October, late February and late March The actual number of population density were, higher in both early of April (932) and August (446 individuals /100 leaves) than those obtained in October , February and March (287 – 148 and 210 individuals / 100 leaves).

In the subsequent year, six peaks of preadult abundance could be discerned. These peaks were recorded in, early May, August, October, December, February and March with (401, 539, 723, 344, 2655 and 813 individuals / 100 leaves, respectively). The highest peak was recorded in early February 1995 when 2655 individuals / 100 leaves were recorded.

I.2 Adult females:

Regarding the adult females, data in Table (1.A) demonstrated that the adult females of this scale had six peaks of seasonal abundance throughout the first year of investigation. These peaks occurred in mid of April, second week of July, late August, November, February and March with of 682, 401, 409,235, 503 and 240 adult females / 100 leaves, respectively.

In 1995/96 year, four peaks of adult females stages abundance may be observed on April, 22^{nd,} June, 6th, October, 19th and mid-February (376, 422, 529, and 1536 individuals / 100 leaves, respectively) (Table 1.A).

I.3. Ovipositing females:

As shown in Table (1.A) the ovipositing females population showed three peaks of seasonal abundance in mid April, late July and late September with 1697, 739 and 238 scales / 100 leaves respectively. In 1995/96, the maximum occurrence of adult females were on late April also (315), early August (408) and early February (785individuals/ 100 leaves) indicating also three peaks of population abundance in this year.

I.4. Adult males:

Estimation of adult male population was estimated by removing the scales of males and counting the adult individuals that were observed after completed their development. Data presented in Table (1.A.), declared that the highest abundance of males in the first year occurred in mid April, second week of July, second week of October and first week of February (51, 120, 56 and 76 individuals / 100 leaves respectively. On the other contrary, those were reached their lowest population in end of April (2 individuals / 100 leaves), January only (one individual / 100 leaves) and on March, 22nd (2 individuals / 100 leaves).

In the subsequent year, 4 counts / 100 leaves may be indicated high abundance. Those occurred in late April (61), third week of August (81), mid-December (147) and early February 598 males / 100 leaves (Table 1.A).

I.5. Total population:

According to data presented in Table (1.A), four peaks of total population abundance may be detected in each of the two years of study. In the 1994/95 year, those were estimated by 3362, 1252, 779 and 663 individuals / 100 leaves in mid-April, late July, late September and late February, respectively. In the second year of investigation, Those occurred in early May (911 individuals), early August (1279), early October (1578) and early February (4941individuals/ 100 leaves).

The lowest relative total population density was recorded in late December and during January of the first year (55-66) individuals /100 leaves, and in early April (30 individuals / 100 leaves) in the second year (Table 1), while on the contrary, the highest total population occurred in mid April (3362 individuals / 100 leaves) in the first year, early February (4941 individuals / 100 leaves) in the second year.

These data are in agreement with those of ***Abou Setta*** (1981) who indicated three generation of *Lepidosaphes beckii* the 1st was the overwinter generation, the 2nd was the spring generation and the 3rd occurred from July to October. Also, ***Helmy*** (1982) in Egypt reported that the purple scale population density has a fluctuation curve with four peaks. ***Rodrigo*** and ***Garcia-Mari*** (1994) studied the proportion of different stages of ***L.beckii*** in orange groves in Valencia, and reported three peaks of population abundance of the immature forms of this insect

I.II. Monthly variation rate (M.V.R.) in *Cornuaspis beckii* population abundance:

As shown in Table (1B) according to the monthly data of total population, the monthly variation rates were calculated to demonstrate the rates of increase or decrease in population of ***C. beckii*** from one month to another. According to data in the mentioned Table. It is clear that the favorable periods for development and population increase in the first year occurred in April, July and February with M.V.R. values of 5.55, 2.92 and 8.75. The highest value 8.75declared that the environmental conditions during February (21.5 C Max. & 5.4C Min. Temperature and 58% R.H.) and their M.V.R. of parasite ***Aphytis lepidosaphes*** with values of 5.0., predatory mites ***Tydeius californicus*** with 1.96 and ***Amblyseius enab*** with 0.79, were the optimum to the development of this pest.

Similar results were obtained in 1995/96 when the favorable periods for population increase were in May, August and February (1.66, 1.49 and 8.34, respectively). The highest value 8.34 declared that the environmental condition during February (21.4 C Max., 5.3 C min.temperature and 58% R.H.) and the M.V.R. of parasites ***Aphytis lepidosaphes*** with values of 0.92, predatory mites ***Tydeius californicus*** with 2.40 and ***Amblyseius enab*** with 2.03 were suitable period for development, as well as these conditions were to be optimum in February for this scale.

Table(1): A population dynamics of the purple scale insect, *Cornuaspis beckii* (*Newm*)on Navel Orange and its parasite *Aphytis lepidosaphes*(Comper) and predatory mite,*Amblyselus enab*, *Tydelus californicus* from 1994 to 1996 at Kaha (Shobra Hares, Qalubiyah Governorate).

Number of population / 100 leaves									
Date	PREADULT	FEMALES	OVIPOSITING	MALES	TOTAL	PARASITOIDES	PREDATORS MITES		PERCENTAGE
	(N1+N2)		FEMALES			*A.lepidosaphes*	*T.californicus*	*A.enab*	parasitesm
28.3.94	225	217	346	18	806	12	1	1	1.49
12.4.94	932	682	1697	51	3362	40	6	33	1.19
12.5	317	74	515	3	909	10	90	68	1.10
27.5	317	67	96	80	560	22	270	50	3.93
11.6	181	188	39	27	435	19	300	21	4.37
26.6	173	76	31	28	308	2	90	35	0.65
11.7	198	401	199	120	918	19	200	45	2.07
26.7	173	322	739	18	1252	55	400	12	4.39
10.8	446	180	181	17	824	30	100	78	3.64
25.8	117	409	116	54	696	26	202	57	3.74
9.9	195	251	100	54	600	9	100	70	1.50
24.9	155	340	238	46	779	31	110	74	3.98
9.10	270	72	234	56	632	40	300	46	6.33
24.10	287	166	211	41	705	49	200	97	6.95
8.11	40	108	59	17	224	26	3	2	11.61
23.11	79	235	61	5	380	22	100	52	5.79
8.12	16	120	4	2	142	2	40	50	1.41
23.12	8	52	3	3	66	1	50	48	1.52
7.1.95	2	56	1	1	60	1	8	9	1.67
22.1	1	49	4	1	55	2	18	15	3.64
7.2	104	144	19	76	343	9	45	19	2.62
22.2.95	148	503	6	6	663	6	6	0	0.90
8.3	6	71	28	6	111	2	17	8	1.80
23.3.95	210	240	23	2	475	1	0	0	0.21
7.4	0	24	3	3	30	30	0	0	100.00
22.4	135	376	315	61	887	178	55	4	20.07
7.5	401	243	238	29	911	16	119	16	1.76
22.5	234	143	230	11	618	11	26	15	1.78
6.6	280	422	28	58	788	7	16	5	0.89
21.6	98	267	71	19	455	47	66	17	10.33
6.7	107	295	279	37	718	2	29	20	0.28
21.7	351	239	238	10	838	6	91	29	0.72
5.8	539	282	408	50	1279	24	25	18	1.88
20.8	332	471	170	81	1054	4	53	12	0.38
4.9	84	390	137	34	645	10	202	63	1.55
19.9	227	483	347	60	1117	12	64	8	1.07
4.10	723	467	325	63	1578	34	163	101	2.15
19.10	42	529	95	54	720	29	0	0	4.03
3.11	53	398	202	20	673	70	20	1	10.40
18.11	135	302	363	29	829	80	52	23	9.65
3.12	344	325	107	34	810	150	185	20	18.52
18.12	130	94	256	147	627	149	15	34	23.76
2.1	73	117	20	30	240	101	10	10	42.08
17.1	382	204	2	46	634	76	100	80	11.99
1.2.96	2655	903	785	598	4941	103	86	120	2.08
16.2	354	1536	183	262	2335	60	179	63	2.57
9.3	813	798	224	190	2025	4	287	76	0.20
24.3	687	464	145	208	1504	34	218	109	2.26

Table(1.B) Monthly counts and their monthly variation notes (MVR) of ***C. beckii***, and its parasite, ***Aphytis lepidosaphes*** and predacious mite (***Amblyseius enab***, ***Tydeius californicus***)) in Qalubiyah Governarate and some weather condition on this pest in two years 1994- 1996

Months	Total pop.	M.V.R	Parasitoids	M.V.R	Predacious mites				Temperature		% R.H
			Aphytis		*Tydeius*	M.V.R	*mblyseiu*	M.V.R	Max	min	
			Lepidosaphes		*californicus*		*enab*				
March	806	-	12	-	1	-	1	-	7.6	16.2	56
April	4479	5.55	45	3.75	106	106	130	130	27.6	10.3	51
May	1469	0.32	32	0.71	360	3.39	118	0.9	31.7	13.5	47
June	743	0.5	21	0.65	390	1.08	56	0.47	34.4	17	48
July	2170	2.92	74	3.52	600	1.53	57	1.01	33.5	18.6	65
August	1520	0.7	56	0.76	302	0.5	135	2.36	33.5	18.5	66
Septembe	1379	0.9	40	0.71	210	0.69	153	1.13	32.9	16.8	59
Oct.	1337	0.96	89	2.22	500	2.38	143	0.93	29.7	14.4	60
Nov.	604	0.45	48	0.53	103	0.2	54	0.37	24.2	10.2	70
Dec.	208	0.34	3	0.06	90	0.87	98	1.81	20.2	7.0	74
Jan.	115	0.55	3	1	26	0.28	24	0.24	18.7	5.2	65
Feb.	1006	8.75	154	5	51	1.96	19	0.79	21.5	5.4	58
March	586	0.58	3	0.2	17	0.33	8	0.42	23.5	7.5	55
April	917	1.56	208	69.33	55	3.23	4	0.5	27.4	10.1	51
May	1529	1.66	27	0.12	145	2.63	31	7.75	31.5	13.1	47
June	1243	0.81	54	2	82	0.56	22	0.7	34.2	17.0	47
July	1556	1.25	8	0.14	120	1.46	49	2.22	33.3	18.3	62
August	2333	1.49	28	3.5	78	0.65	30	0.61	33.4	18.3	66
Septembe	1762	0.75	22	0.78	266	3.41	71	2.36	32.7	16.4	59
Oct.	2298	1.3	63	2.86	163	0.61	101	1.42	29.2	14.0	68
Nov.	1502	0.65	150	2.38	72	0.44	24	0.23	24	10.0	75
Dec.	1437	0.95	299	1.99	200	2.77	54	2.25	20	6.8	65
Jan.	874	0.6	177	0.59	110	0.55	90	2.0	18.9	5.3	58
Feb	7276	8.34	163	0.92	265	2.41	183	2.03	21.4	5.3	58
March	3529	0.48	38	0.23	505	1.9	185	1.01	23.2	7.7	55

II. Seasonal fluctuations in population of the Date-palm scale insect, *Parlatoria blanchardii* (Targ.) infesting Valencia citrus trees and factors affecting on it :

The monthly counts of different stages of ***P. blanchardii*** (Targ.) at Benha (Qalubiyah Governorate) throughout three successive years 1994 - 1996 are presented in Table (2.A)). Also means of monthly records of temperature and relative humidity throughout the three years of investigation were demonstrated in the same Table.

II. 1 Preadults stages (N1+N2):

Concerning the preadults of the Date- palm scale insect in the first year of investigation, two peaks of the preadults abundance could be detected in June (7561 individuals / 40 branches) and September (4120 individuals / 40 branches) in September 1994. In the subsequent year (1995), also two peaks of abundance were recorded, but in May and September. Those were estimated by 7430 and 3999 individuals / 40 branches, respectively. Again two peaks of abundance occurred in 1996 (7602 and 4199 individuals) in May and September. As sean in Table (2A), the lowest abundance of this scale occurred in January and February in the three years of study (3&2 in 1994, 8 & 9 in 1995 and 8 & 11 individuals / 40 branches in 1996 in January & February, respectively). An increase in population of ***P.blanchardii*** started from March and this increase continued until reach the first peak of abundance in May or June. Although of the decrease in population after June, the population remained high in July and August and increased again to reach the second peak of abundance during September. (Table, 2A)

II.2. Adult females:

In contrary to the preadults, ***P. blanchardii*** females were of high abundance during January of three years of study (2957, 3216 and 2865 individuals in 1994, 95 and 1996, respectively, Table 2.A). Successive decreased occurred during the subsequent months with May (1206, 1121 and 1149 individuals / 40 branches, respectively). After that the first peak of abundance occurred in June of the three years (3218, 3429 and 3117 individuals, respectively). Another peak of females abundance could be detected, on branches of Valenchia orange during November

(4770,4561 and 4866 individuals / 40 branches, respectively; Table 2.A) May may be fairly considered as the month of relatively, lower abundance of *p. blanchardii* females as counts of 1206, 1121 and 1149 individuals / 40 branches, respectively were counted during May of 1994, 95 & 96, respectively.

II.3. Ovipositing females:

The ovipositing females in the first year had also two peaks of seasonal abundance occurred in April and September of the three weeks. Those were estimated by 2226 & 1671 individuals in 1994, 1905 & 1416 in 1995 and 2061 & 1875 individuals / 40 branches in 1996 during April and September, respectively (Table, 2.A). The months of January, February and December could be considered as months of low abundance of females as the relative population densities in those three months were estimated by 9, 188 and 8 individuals in 1994; 12, 218 and 6 individuals in 1995 and 3, 66 and 38 individuals / 40 branches in 1996, respectively; Table 2.A. The remaining months showed intermediate population densities of this pest.

II.4. Adult males :

Estimation of adult males population was dependent on counting the pupal stage where the adult individuals are free after completed their development and emergence. Results in Table (2.A) declared that the highest abundance of males in the first year were occurred in February, August and October with numbers of 126, 148 and 171 scales / 40 branches, respectively. While, males reached their lowest population in May and June with 24 and 28 scales / 40 branches. In the subsequent year the largest males, activity took place in both February and October 1995 when 75 and 84 scales / 40 branches were recorded. But in the third year of investigation, high activity took place in April and October 1996 with numbers of 112 and 126 scales / 40 branches, respectively.

II.5. Total population :

Data presented in Table (2.A) indicated two peaks of total population abundance in each of the three years of study. These peaks occurred in June and September 1994 (1473 and 8235 individuals / 40 branches, respectively), 10092 and 7764 individuals in May and September of the subsequent year, and 10214 and 8699 individuals in May and September, respectively 1n1996.

The obtained data, general, showed that the total population abundance was lower in January, February and December. A successive increase in abundance started from March until reached the first peak in May or June after which a decrease in total population occurred during July and August followed by an increase to reach the second peak of abundance in September (Table 2.A) that was followed by a gradual decrease in total population towards the end of the year.

It could be also observed from data in Table (2.A) that the former peak of total population abundance (that of June 1994 and May of 1995 & 1996) was higher than the later peak which occurred in September of the three years.

These data agree with ***Mackie*** (1936,38, 1940) who indicated that ***P. blanchardii*** had two peaks of abundance, year, the first occurred in mid April and the second in July. The same result was detected by Egypt (1957. While **Abdel-Halleem Nahla** (1997) reached that ***Parlatoria sp***. had three annual generations during two successive years (1993 and 1994).

II.II. Monthly variation rate (M.V.R.) in *Parlatoria blanchardii* population abundance:

From the data of monthly counts of total population of ***P. blanchardii***, the monthly variation rates (M.V.R.) were tabulated in Table (2.B) throughout the three years of investigation. Results declared that the favorable periods for development and increase of the total population were in June and September1994, with values of 1.64 and 2.12 .The highest value 2.12 declared that the environmental condition during September (32.9 C Max.T& 16.8 C Min.T and 59.0 % R.H.) seemed to be the optimum for population growth of scales. While, it could be also observed that the population abundance of the parasitoid, ***Aphytis lepidosaphes*** and the predacious mite, ***Tydeius californicus*** was very low. The same observation may be detected in May and September of the two subsequent years (1995 and 1996) (Table, 2.B).

Table(2A): Population dynamics of the palm scale insect, ***Parlatoria blanchardii*** (*Targ.*) **On Valenchia** orange and parasite ***Aphytis lepidosaphes*** (Comper)and predatory mite(***Amblyseius enab***, ***Tydeius californicus)*** from 1994 to 1997 at Degwa Qalubiyah Governorate.

Date	Number of population / 40 branches					TOTAL	PARASITE	PREDACIOUS MITE
	PREADULT	FEMALE	OVIPOSITING FEMALE	MALE			*Aphytis lepidosaphes*	*Tydeius californicus*
JAN 94	3	2957	9	44		3013	2	1
FEB.	2	2750	188	126		3066	3	2
MAR.	6	2646	1996	111		4759	4	3
APR.	1038	1851	2226	51		5166	0	1
MAY.	4098	1206	1650	24		6978	1	1
JUN.	7561	3218	666	28		11473	0	2
JUL.	2106	2046	420	37		4609	4	11
AUG.	1056	1524	1146	148		3874	4	14
SEPT.	4120	2415	1671	29		8235	1	1
OCT.	2951	3879	405	171		7406	3	2
NOV.	636	4770	191	45		5642	0	2
DEC.	9	4254	8	39		4310	0	2
JAN 95	8	3216	12	43		3279	1	1
FEB.	9	2493	218	75		2795	1	42
MAR.	1098	2769	1677	71		5615	2	20
APR.	4008	1935	1905	68		7916	1	11
MAY.	7430	1121	1483	58		10092	1	1
JUN.	2391	3429	642	49		6511	1	3
JUL.	2360	1844	436	64		4704	1	1
AUG.	1140	1842	1128	64		4174	1	8
SEPT.	3999	2314	1416	35		7764	1	3
OCT.	3030	3744	429	84		7287	1	4
NOV.	609	4561	551	24		5745	1	2
DEC.	126	4038	6	38		4208	3	1
JAN 96	8	2865	3	42		2918	1	1
FEB.	11	2793	66	74		2944	1	2
MAR.	963	2493	1755	94		5305	1	3
APR.	4206	1899	2061	112		8278	1	1
MAY.	7602	1149	1410	53		10214	0	1
JUN.	2484	3117	729	68		6398	1	2
JUL.	2469	1569	405	81		4524	0	11
AUG.	990	1309	1257	96		3652	1	14
SEPT.	4199	2559	1875	66		8699	1	1
OCT.	2508	4002	654	126		7290	1	2
NOV.	681	4866	366	106		6019	0	3
DEC.	276	4313	38	48		4675	0	2

N.B. No ***A. enab*** mite were detected

Table(2. B) Monthly counts and their monthly variation notes (MVR) of *Parlatoria blanchardi and parasites 'Aphytis lepidosaphes* and predacious mite (***Amblyseius enab, Tydeius californicus)*** in Qalubiyah Governorate and some weather condition on this pest in three years 1994 - 1997

Months	Total pop.	M.V.R	Parasits	M.V.R	Predacious mites				Temp.		% R.H
			Aphytis		*Tydeius*	M.V.R	*Amblyseius*	M.V.R		min.	
			lepidosaphes		*californicus*		*enab*				
Jan.	3013	-	2	-	1	-	0	-	18.9	5.3	65
Feb.	3066	1.01	3	1.5	2	2	0	0	21.5	5.4	58
March	4759	1.55	4	1.3	3	1.5	0	0	23.1	7.6	56
April	5166	1.08	0	0	1	0.33	0	0	27.6	10.3	51
May	6978	1.35	1	0	1	1	0	0	31.7	13.5	47
June	11473	1.64	0	0	2	2	0	0	34.4	17	48
July	4609	0.4	4	0	11	5.5	0	0	33.5	18.6	65
August	3874	0.84	4	1	14	1.27	0	0	33.5	18.5	66
September	8235	2.12	1	0.25	1	0.07	0	0	32.9	16.8	59
Oct.	7406	0.89	3	3	2	2	0	0	29.7	14.4	60
Nov.	5642	0.76	0	0	2	1	0	0	24.2	10.2	70
Dec.	4310	0.76	0	0	2	1	0	0	20.2	7	74
Jan.	3279	0.76	1	0	1	0.5	0	0	18.7	5.2	65
Feb.	2795	0.85	1	1	42	42	0	0	21.5	5.4	58
March	5615	2	2	1	20	0.47	0	0	23.5	7.5	55
April	7196	1.28	1	1	11	0.55	0	0	27.4	10.1	51
May	10092	1.4	1	1	1	0.09	0	0	31.5	13.3	47
June	6511	0.64	1	1	3	3	0	0	34.2	17	47
July	4704	0.72	1	1	1	0.33	0	0	33.3	18.3	62
August	4174	0.88	1	1	8	8	0	0	33.4	18.3	66
Sept.	7764	1.86	1	1	3	0.37	0	0	32.7	16.4	62
Oct.	7287	0.93	1	1	4	1.33	0	0	29.2	14	54
Nov.	5745	0.78	1	1	2	0.5	0	0	24	10	68
Dec.	4208	0.73	3	3	1	0.5	0	0	20	6.8	75
Jan.	2918	0.69	1	0.33	1	1	0	0	18.9	5.3	65
Feb.	2944	1	1	1	2	2	0	0	21.4	5.3	58
March	5305	1.8	1	1	3	1.5	0	0	23.2	7.7	55
April	8278	1.56	1	1	1	0.33	0	0	27.7	10.3	51
May	10214	1.23	0	0	1	1	0	0	31.7	13.4	47
June	6398	0.62	1	0	2	2	0	0	34.4	17.2	47
July	4524	0.7	0	0	11	5.5	0	0	33.4	18.4	61
Aug	3652	0.8	1	0	14	1.27	0	0	33.3	15.5	65
Sept	8699	2.38	1	1	1	0.07	0	0	22.7	10.7	62
Oct	7290	0.83	1	1	2	2	0	0	29.5	14.5	55
Nov	6019	0.82	0	0	3	1.5	0	0	24.1	10.3	67
Dec	4675	0.77	0	0	2	0.66	0	0	20.3	7.2	74

III. Seasonal fluctuations in population of the california red scale insect *Aonidiella aurantii* population infesting Baladi citrus trees and factors affecting on it:

The result of monthly counts of different stages of the California red scale, *Aonidiella aurantii* (Mask.) at Qalubiyah through two successive years 94 - 96 are presented in Table (3.A) Also, means of monthly records of temperature and relative humidity throughout the two successive years of investigation are presented in Table (3.A).

III.1. Preadults stages (N1+N2):

Concerning the preadults of the California red scale in the first year of investigation, two peaks were recorded in June1994 and March1995. The heights population density were recorded in both two months June and March with 795 and 658 individuals / 100 leaves.

In the second year of the investigation, three peaks of infestation of preadults were recorded (Table 3.A). The population of these peaks were 423, 993 and 983 individuals /100 leaves in May, August 1995 and March 1996, respectively

III.2. Adult females:

Regarding adult female of the California red scale, results obtained are given in (Table 3.A).These data demonstrated that the adults females of the California red scale had three peaks of seasonal abundance throughout the first year of investigation. These peak, occurred in June 1994, August 1994 and January 1995 with total population of 633, 524 and 311 adult females / 100 leaves, respectively.

In The second year of investigation, the maximum population density of adult females occurrence were on July 1995, August 1995 and March 1996 with 577, 924 and 11175 adult females /100 leaves. On the other hand the minimum occurrence of adult female in November 1995, December 1995 and January 1996 with 78, 49 and 18 adult female /100 leaves.

III.3. Adult males :

Estimation of adult male population was dependent on the counting of the pupal stage where the adults individuals are flying after completed their development and emerging directly. Results in Table (3.A) declared that the highest abundance of males in first year of investigation were occurred in mid of year in June 1994 and August 1994 with population density 457 and 114 scales /100 leaves. On the other hand, they were recorded to be the lowest population in both of November 1994 and December 1994 with population 2 and 1 scales /100 leaves. In the second year of investigation, the largest male, activity took place in both August 1995 and March 1996 with 74 and 280 scales /100 leaves, respectively.

III.4. Total population:

The obtained results showed that the total population of this scale had three peaks of infestation in the first year of study with numbers 1885, 1114 and 841 individuals /100 leaves in June 1994, August 1994 and March 1995 respectively. Table (3.A).

The total population reached its lowest numbers in the first year at November and December 1994 when 58 and 38 individuals/ 100 leaves, also the same trend occurred in the second year in December 1995 and January 1996 with numbers of 72 and 44 individuals /100 leaves, respectively.

These data were agreeable with ***Helmy et. al.***(1994),recorded that these were three generationsduring the two years of study.

Khalaf and Sokhansanj was carried out in (1993), mentioned that a survey of citrus orchards in Fars province, Iran in (1986 - 89) and the data declared that there were 5 generations for ***Aonidiella aurantii*** per years with maximum population density in the 4th and 5th generation. ***Rizk et. al.*** (1978) stated that ***A. aurantii*** had five annual peaks of infestation these dot were agreeable with June, August and March.

III.II. Monthly variation rate (M.V.R.) in *Aonidiella aurantii* populati abundance :

From the results of monthly counts of total population of ***A. aurantii*** monthly variation rate (M.V.R.) were tabulated in Table (3.B) throughout the two years of investigation. Results declared that the favorable periods for development and increase of the total population in the first year were in, June August 1994 and March 1995 with values 1.97,1.05 and 2.76. The highest of the parasite M.V.R. value ***Aphytis lepidosaphes*** was 1.4, predacious mites, ***Tydeius californicus*** with values 0.57, ***Amblyseius enab*** with values 0.71 in March 1995. In August 1994 the parasite with value 22 individuals / 100 leaves. The highest value 2.76 declared that the environmental conditions during March were optimum to the development of the California red scale 23.0 C Max., 7.5 Min. temperature and 55% R.H.

Similar results were obtained in the second year of investigation. M.V.R. when the favorable periods were in, May, August 1995 and March 1996 (1.9, 2.16 and 2.33). The highest parasites, ***Aphytis lepidosaphes*** M.V.R. value with (3.35) in August 1995 means in August 58 inch/ 100 leaves. But M.V.R. with values very low belongs the predacious mites ***Tydeius californicus*** and ***Amblyseius enab*** with values 0.64 and 0.31 .

The environmental conditions recorded in March, 23.2 C Max., 7.7 C Min. temperature and 55% R.H.) were suitable period for population growth.

Table(3A): population dynamics of the California red scale insect ***Aonidella aurantii*** (mask) on Balady Orange,***Citrus sinensis*** and parasite,***Aphytis lepidosaphes*** (Comper). and predatory mites , ***Amblyseius enab,Tydeius californicus*** *from 1994 to 1996* at Kaha,Shobra Hares,Qalubiyah Governorate.

Number of population /100 leaves							
Date	PREADULT	FEMALE	MALE	**TOTAL**	PARASITE	PREDATORS MITES	
					Aphytis	*Tydeius*	*Amblyseius*
					lepidosaphe	*californicus*	*enab*
23.4.94	140	130	13	283	22	490	15
23.5	649	303	3	955	0	489	111
22.6	795	633	457	1885	24	707	91
22.7	627	416	13	1056	33	609	84
21.8	476	524	114	1114	22	186	21
20.9	192	220	17	429	15	110	60
20.1	170	164	12	346	11	208	120
19.11	9	47	2	58	2	196	77
19.12	6	31	1	38	3	33	17
18.1.95	52	311	18	381	36	174	254
17.2	52	235	17	304	5	138	87
18.3	658	161	22	841	7	80	62
17.4	185	252	14	451	25	122	44
17.5	423	417	18	858	14	160	61
16.6	140	430	28	598	20	153	112
16.7	321	577	23	921	17	128	69
15.8	993	924	74	1991	58	82	22
14.9	166	362	9	537	18	154	42
14.1	393	435	27	855	49	72	107
13.11	14	78	6	98	2	118	18
13.12	15	49	8	72	1	0	20
12.1.96	22	18	4	44	1	25	101
11.2	776	248	18	1042	3	143	90
12.3	983	1175	280	2438	2	41	41
11.4	960	982	94	2036	0	33	23

Table(3 B) .Monthly counts and their monthly variation notes (MVR) of ***A. aurantii***,and parasite,***Aphytis lepidosaphes*** and predacious mite,(***Amblyseius enab***, ***Tydeius californicus***) inQalubiyah Governorate and some weather condition on this pest in two years 1994 - 1996.

Months	Total of pop.	M.V.R	Parasite ***Aphytis lepidosaphes***	M.V.R	Predacious mites ***Tydeius californicus***	M.V.R	***Amblyseius enab***	Temperature. M.V.R	Max.	Min.	%R.H
Apr-94	283	-	22	-	490	-	15	-	27.6	10.3	51
May	955	3.37	0	0	489	0.99	111	74	31.7	13.5	47
June	1885	1.97	24	0	707	1.44	91	0.81	34.4	17.0	48
July	1056	0.56	33	1.37	609	0.86	84	0.92	33.5	18.6	65
Aug.	1114	1.05	22	0.66	186	0.3	21	0.25	33.5	18.5	66
Sept.	429	0.38	15	0.68	110	0.59	60	2.85	32.9	16.8	59
Oct.	346	0.8	11	0.73	208	1.89	120	2.00	29.7	14.4	60
Nov.	58	0.16	2	0.18	196	0.94	77	0.64	24.2	10.2	70
Dec.	38	0.65	3	1.5	33	0.16	17	0.22	20.2	7.0	74
Jan.	381	10.02	36	12	174	5.27	254	14.94	18.7	5.2	65
Feb.	304	0.79	5	0.13	138	0.79	87	0.34	21.5	5.4	58
March	841	2.76	7	1.4	80	0.57	62	0.71	23	7.5	55
Apr-95	451	0.53	25	3.57	122	1.52	44	0.7	27.4	10.1	51
May	858	1.9	14	0.56	160	1.31	61	1.38	31.5	13.3	47
June	598	0.69	20	1.42	153	0.95	112	1.83	34.2	17	47
July	921	1.54	17	0.85	128	0.83	69	0.61	33.3	18.3	62
Aug.	1991	2.16	58	3.41	82	0.64	22	0.31	33.4	18.3	66
Sept.	537	0.26	18	0.31	154	1.87	42	1.9	32.7	16.4	62
Oct.	855	1.59	49	2.72	72	0.46	107	2.54	29.2	14	59
Nov.	98	0.11	2	0.04	118	1.63	18	0.16	24	10	68
Dec.	72	0.73	1	0.5	0	0	20	1.11	20	6.8	75
Jan.	44	0.61	1	1	25	0	101	5.05	18.9	5.3	65
Feb.	1042	23.68	3	3	143	5.72	90	0.89	21.4	5.3	58
March	2438	2.33	2	0 66	41	0.28	41	0.45	23.2	7.7	55
Apr-96	2036	0.83	0	0	33	0 8	23	0.56	27.7	10.3	51

FIG: Population dynamics of the, *Cornuaspis beckii* Newm. *Paralatoria blanchardii* targ. and Aonidella aaurantii mask on orange Citrus sinensis from 1994 to 1995 at Qalubiyah Governorate.

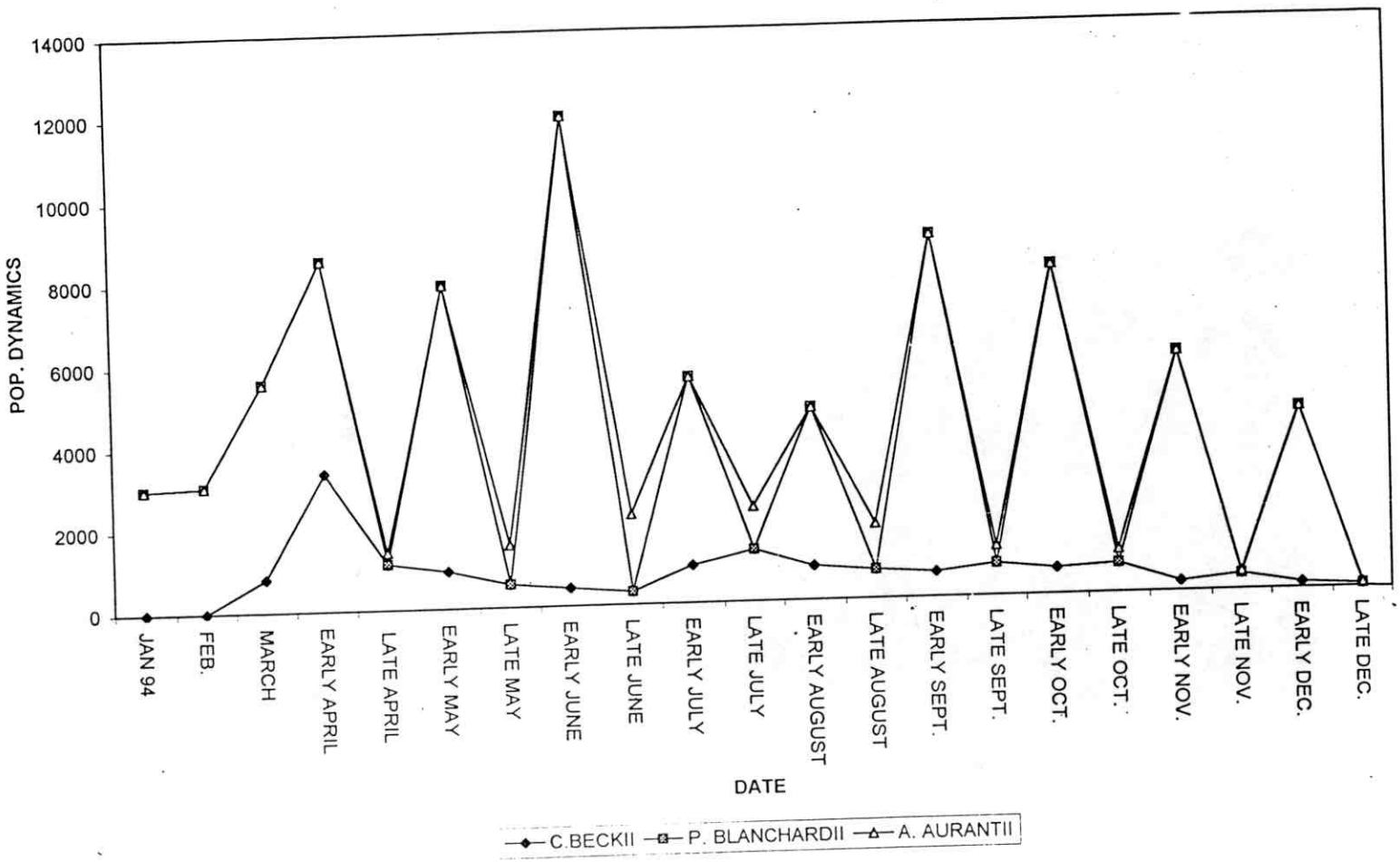


FIG. Population dynamics of the, *Cornuaspis beckii* Newm. *Paralatoria blanchardii* targ. and Aonidella aaurantii mask on orange Citrus sinensis from 1995 to 1996 at Qalubiyah Governorate.

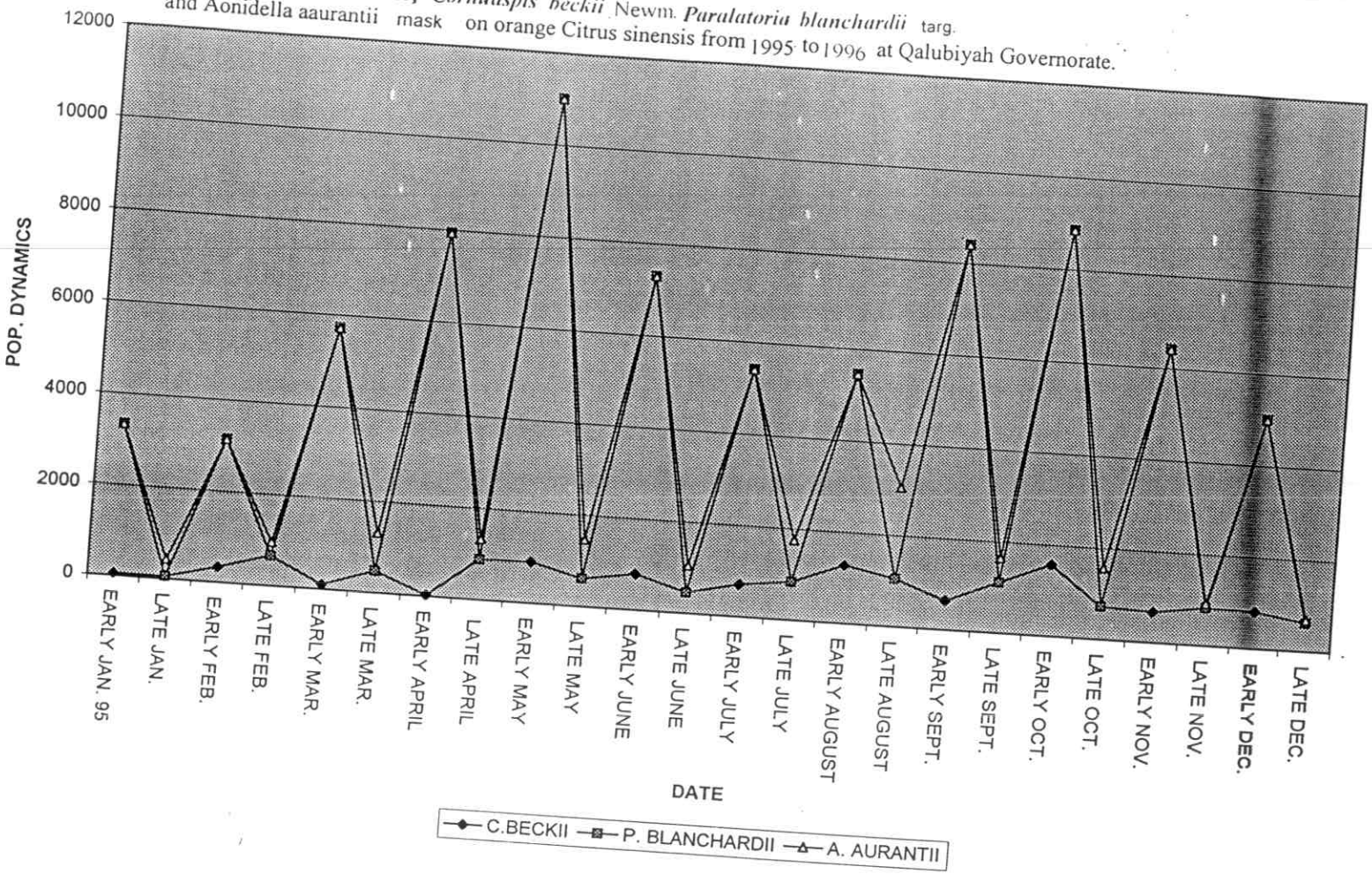
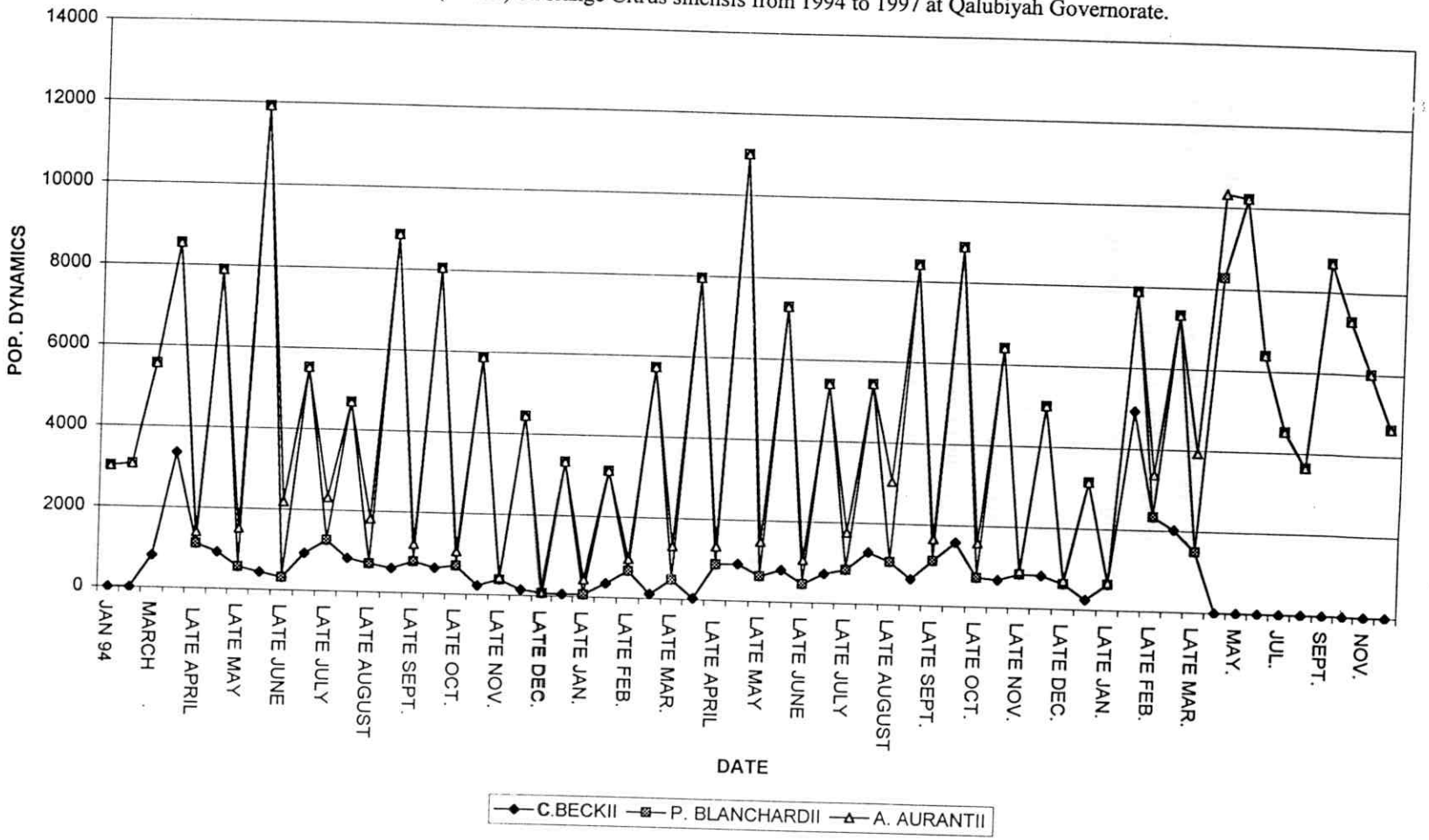


FIG: Population dynamics of the,**Cornuaspis beckii**(Newm), **Parlatoria blanchardii** (targ.) and **Aonidella aurantii** (mask) on orange Citrus sinensis from 1994 to 1997 at Qalubiyah Governorate.



IV. Chemical control of the scale insects infested citrus trees in Qalubiyah Governorate :

IV.I. Efficacy of the insecticides against purple scale insect, *Cornuaspis beckii* (Newm):

IV.I.a.First experiment (one insecticidal application on April,15th 1994):

In this experiment, 4 insecticides; Methadithion, Actellic, Buprofezin and Diazinon were applied on April, 15th 1994.

The reduction percentages of ***Cornuaspis beckii*** (Newm.) in the total number of preadult stages (N1+N2), adult females, ovipositing females and total alive stages infesting 40 leaves, and its parasitoid, ***Aphytis lepidosaphes***, and predatory mites, (***Amblyseius enab*** & ***Tydeius californicus***) post treatment by Methadithion, Actellic, Buprofezin and Diazinon in 1994 are presented in Table (4) and Fig. (4). The percentage reduction of total preadult stages (N1+N2) number reached 100 % due to application of Methadithion and Actellic, at 43, 58, 68, 88 and 109 days after treatment. Hundred percent reduction was reached at 68 and 88 days in case of Buprofezin. However Diazinon treatment produced 100 % reduction after treatment and citrus trees remained free of any infestation at all days of inspection. (Fig 4a). The lowest reduction (75 %) occurred at 58 days in case of Buprofezin (Table 4).

Percentage reduction of the adult females was 100 % after treatment by Methadithion, Actellic and Diazinon at (43, 58, 68 & 109), (28,43, 68, 88 & 109 days) and at 43 days after treatments, respectively (Fig 4:b). However, Buprofezin treatment produced percentage reduction of 40, 79.78, 93.26, 85.61, 80.58 and 91.43 % after 28, 43, 58, 68, 88 and 109 days from treatment, respectively (Table 4).

Percentage reduction in numbers of the ovipositing ***C. beckii*** females after treatment with Methadithion and Actellic insecticides were (90.28 at 28 days and 100 % at 43 days and after that), for both compounds. Buprofezin and Diazinon showed reduction percentage of 9.72, 90.91,71.43, 100, 88.57 & 90.24 % and 70.83, 90.91, 100,100, 100% & 97.56 at 28, 43, 58, 68, 88 and 109 days after insecticidal application., respectively.

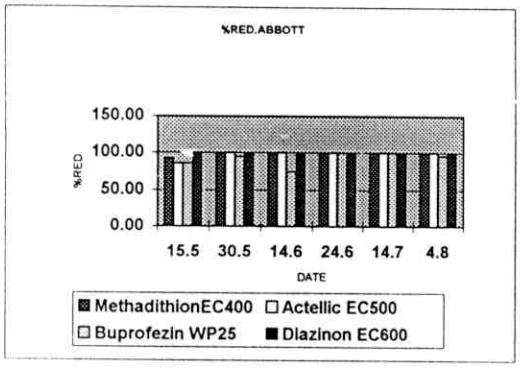
Regarding the total number of the considered stages for inspection on citrus trees: Methadithion and Actellic treatments caused 100 % reduction in this population after 43, 58, 68 & 109 and 43, 68, 88 & 109 days of treatment, respectively. Buprofezin and Diazinon caused 92.0 and 94.67 % reduction, respectively after 109 days of treatment. However the lowest mortality (5.11%) was produced by Buprofezin at 28 days after treatment. The percentages reduction caused by Diazinon were 82.48, 99.15, 99, 98.76, 98.92 and 94.67 after 28, 43, 58, 68, 88 and 109 days from treatment, respectively.

No parasitism on ***C. beckii*** could be detected after Methadithion application: i.e. 100 % reduction of ***A. lepidosaphes*** parasite population were caused at all days. However Actellic and Buprofezin caused 100 % population reduction at all days except at 28 days that showed 75 % reduction for both compound. Diazinon treatment caused 100 % reduction at 28, 68, 88, and 109 days, and ~200 & 98.95 % at 43 and 58 days, respectively.

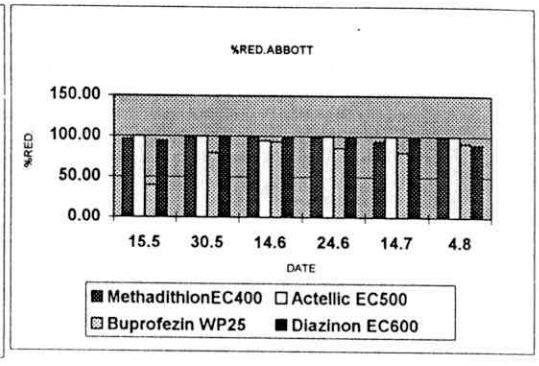
Buprofezin treatment produced 100 % population reduction of predatory mites (***A. enab*** & ***T. californicus***) individuals at all inspections. Methadithion caused 100 % reduction at all days except at 68 days after treatment that showed 85.71 % reduction. Treatment by Diazinon caused 100 % mortality except at 58, 68 and 88 days that produced 81.48,57.14 and 85.19 %, respectively. However Actellic produced 100 % reduction only at 43 days and caused reduction percentage of 70.59, 85.19, 78.57, 25.93 and 93.1 % at 28, 58, 68, 88 and 109 days after treatment, respectively.

Table(4) : Reduction percentages of *Cornuaspis beckii;* and associated parasitoid, *Aphytis lepidosaphes* and predatory mites, *Amblyseius enab* & *Tydeius californicus* individual counts due to insecticic application on April, 14th .1994.(First experiment)

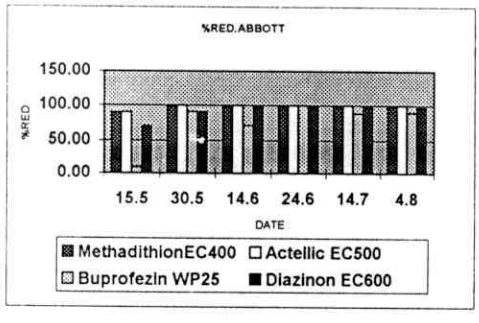
Inspection date		15.5	30.5	14.6	24.6	14.7	4.8.94
	pre spray count/ 40 leaves						
Days after treatment		Reduction percentages after (...days) 28	43	58	68	88	109
a:Preadult(N1+N2)							
MethadithionEC400	168	92.86	100.00	100.00	100.00	100.00	100.00
Actellic EC500	31	85.71	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	186	85.71	95.24	75.00	100.00	100.00	96.15
Diazinon EC600	109	100.00	100.00	100.00	100.00	100.00	100.00
b:Adult females							
MethadithionEC400	99	96.36	100.00	100.00	100.00	94.17	100.00
Actellic EC500	92	100.00	100.00	94.38	100.00	100.00	100.00
Buprofezin WP25	76	40.00	79.78	93.26	85.61	80.58	91.43
Diazinon EC600	85	94.55	100.00	98.88	98.48	98.06	90.00
c:Ovipositing females							
MethadithionEC400	187	90.28	100.00	100.00	100.00	100.00	100.00
Actellic EC500	83	90.28	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	188	9.72	90.91	71.43	100.00	88.57	90.24
Diazinon EC600	134	70.83	90.91	100.00	100.00	100.00	97.56
d:Total alive stages							
MethadithionEC400	454	92.70	100.00	100.00	100.00	96.77	100.00
Actellic EC500	206	93.43	100.00	95.00	100.00	100.00	100.00
Buprofezin WP25	450	5.11	82.91	60.00	88.20	87.10	92.00
Diazinon EC600	328	82.48	99.15	99.00	98.76	98.92	94.67
e:*A.lepidosaphes*							
MethadithionEC400	10	100.00	100.00	100.00	100.00	100.00	100.00
Actellic EC500	4	75.00	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	6	75.00	100.00	100.00	100.00	100.00	100.00
Diazinon EC600	4	100.00	-200.00	98.95	100.00	100.00	100.00
f : *A.enab* and *T. californicus*							
MethadithionEC400	0	100.00	100.00	100.00	85.71	100.00	100.00
Actellic EC500	0	70.59	100.00	85.19	78.57	25.93	93.10
Buprofezin WP25	0	100.00	100.00	100.00	100.00	100.00	100.00
Diazinon EC600	0	100.00	100.00	81.48	57.14	85.19	100.00



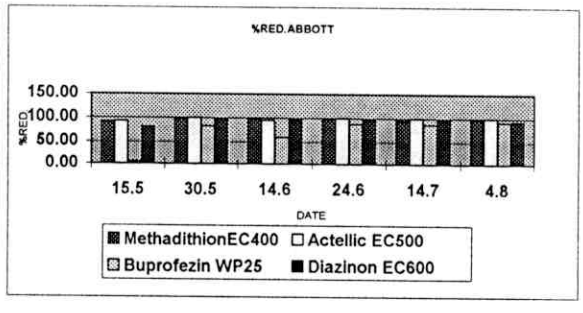
a:PreadultT(N1+N2)



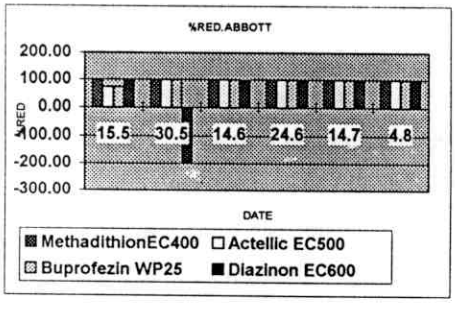
b : Adult females



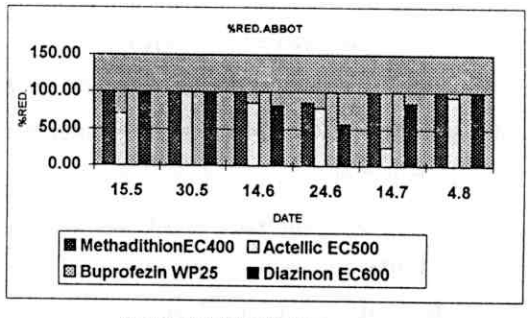
c : Ovipositing females



d:Total alive stages



e : ***A. lepidosaphes***



f : ***A. enab*** and ***T. californicus***

Fig (4) Reduction percentages of ***Cornuaspis beckii;*** and associated parasitoid, ***Aphytis lepidosaphes*** and predatory mites, ***Amblyselus enab*** & ***Tydelus californicus*** individual counts due to insecticidal application on April, 14th .1994. (First experiment)

IV.1.b.Second experiment (one insecticidal application on April,19th 1994):

The same insecticides used in the first experiment were applied in this experiment except adding KZ oil as a fifth treatment. Insecticidal application took place on April, 19th 1994.

The reduction percentages of ***Cornuaspis beckii*** total number of, preadult (N1+N2) individuals, adult females, ovipositing females and alive stages infesting 40 leaves, and its parasitoid, ***Aphytis lepidosaphes***, and predatory mites, (***Amblyseius enab*** & ***Tydeius californicus***) post treatment by Methadithion, Actellic, Buprofezin, Diazinon and oil in 1994 are presented in Table (5) and Fig. (5). Methadithion application caused complete reduction of the nymphal stage, as no individual could be detected on leaves of all the 6 inspections which extended for 104 days after treatment. Actellic caused 91.67% reduction 27 days after treatment increased to 100% after two weeks later and also the remaining 4 inspection. Hundred percent reductions were reached at 74, 89, and 104 days after treatment in cases of Buprofezin and Diazinon. However, oil treatment caused 58.3% reduction in the nymphal count 27 days after treatment, but this percentage increased until reached 100% after 89 days and 70% at 104 days from treatment Table (5) and Fig.(5).

Highest reduction % in the adult females count occurred due to Methadithion application which caused 100% reduction at 27, 43 and 89 days after treatment. The remaining 3 inspections showed reduction percentages very close to the 100% (98.9, 98.4 and 97.1 at 59, 74 and 104 days after treatment, respectively). Actellic caused 84.9 % reduction after 27 days, increased to 100% at 43, 74 and 104 days after treatment. Buprofezin was less effective on ***C.beckii***; the reduction percentages never reached 100%, but reached a minimum of 54.7 % at 27 days and a maximum of 99.26 at 89 days after treatment. Reduction percentages in ***C. beckii*** female count reached 69.8% after 27 days of Diazinon application, but this percentage increased to 98.9 % in the subsequent sample and to 100 % 89 days after treatment. KZ oil appeared as the least effective on ***C. beckii*** females, causing 28.3 % reduction in population after 27 days from treatment, 17.2 % after 59 days and 59.1% after 74 days from treatment.

The reduction percentages among ovipositing females of ***C. beckii*** after treatment with Methadithion or Diazinon was 100 % at 59 days after treatment and the subsequent samples. Actellic caused complete reduction to ovipositing females at

43, 59, 74 and 104 days. Buprofezin gave percentage reduction of 100 % at 59 and 89 days only. However oil treatment caused reductions that ranged from 60.% at 59 days to 93.9% at 89 days after treatment.

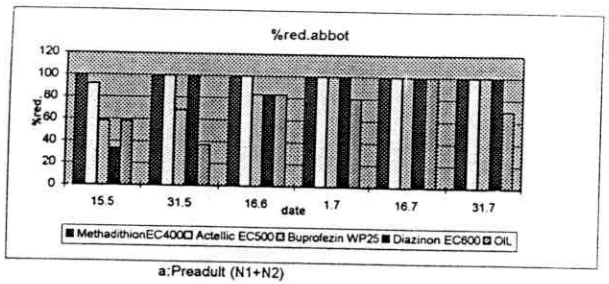
Regarding the reduction percentages in population of total alive stages of ***C. beckii*** after 27 days of insecticidal application, those reached a maximum of 97 % in case of Methadithion and a minimum of 49.6% in case of KZ oil. After 43 days of treatment, these percentages reached 100% in case of Actellic treatment and 99.2% for Methadithion and Diazinon treatments while, complete reduction in population occurred after 89 days of treatment by the two latter compounds. However inspections of the last samples (104 days after treatment) revealed the absence of any alive stages after treatment by Actellic.

Data in Table (5) indicated that KZ oil was the least effective on ***A. lepidosaphes*** as it caused 33.9% reduction in the parasitoid population 27 days after treatment, but this effect disappeared afterwards (at 43 and 59 days after treatment). On the contrary Methadithion had the severest effect on the parasitoid, (98.5% reduction), followed by Actellic (86.1%) after 27 days of treatment, but after 43 days all of Methadithion, Actellic, Buprofezin and Diazinon led to 50% reduction in the parasitoid population.

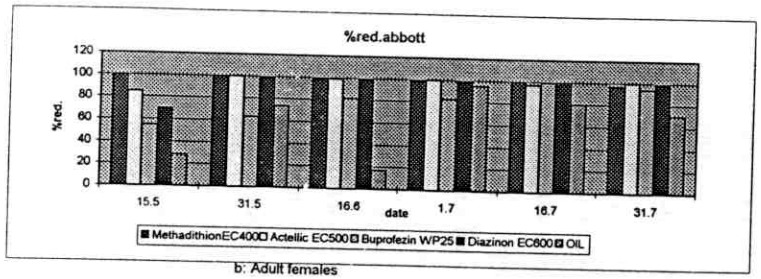
As for the affect on the predatory mites, ***A. enab*** and ***T. californicus***, Methadithion and Actellic treatments produced 100 % reduction in population and, that severe effect extended, nearly, among all the subsequent samples up to 104 days after treatment to give proof that these compounds had the severest effect on ***C. beckii*** natural enemies. Buprofezin and Diazinon caused also 100% reduction in the predatory mites population, but after 43 days of field treatment. KZ oil which appeared least harmful on the parasitoid ***A. lepidosaphes*** had also severe effect on the predatory mites as it caused 100% reduction in their population after 27 and 43 days of treatment, and this effect decreased after 59 and 74 days (70.4 and 46.4, respectively; Table, 5).

Table (5) : Reduction percentages of ***Cornuaspis beckii;*** and associated parasitoid, ***Aphytis lepidosaphes*** and predatory mites, ***Amblyselus enab*** & ***Tydelus californicus*** individual counts due to insecticidal application on April, 19th.1994 (second experiment)

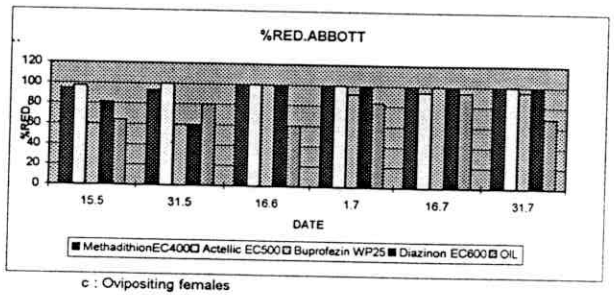
inspection date:		15.5	31.5	16.6	1.7	16.7	31,7.94
	Pre spray count/40 leaves						
Days after treatment		Reduction percentages after (...days)					
		27	43	59	74	89	104
a:Preadult (N1+N2)							
MethadithionEC400	65	100.00	100.00	100.00	100.00	100.00	100.00
Actellic EC500	51	91.67	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	76	58.33	68.42	83.33	100.00	100.00	100.00
Diazinon EC600	44	33.33	100.00	83.33	100.00	100.00	100.00
KZOIL	58	58.33	36.84	83.33	80.00	100.00	70.00
b:Adult females							
MethadithionEC400	101	100.00	100.00	98.85	98.36	100.00	97.06
Actellic EC500	279	84.91	100.00	98.85	100.00	97.04	100.00
Buprofezin WP25	98	54.72	63.22	81.61	82.79	99.26	94.12
Diazinon EC600	78	69.81	98.85	98.85	98.36	100.00	98.53
KZOIL	77	28.30	73.56	17.24	95.08	80.00	70.59
c:Ovipositing females							
MethadithionEC400	206	94.29	93.33	100.00	100.00	100.00	100.00
Actellic EC500	127	97.14	100.00	100.00	100.00	93.94	100.00
Buprofezin WP25	158	60.00	60.00	100.00	91.67	100.00	94.87
Diazinon EC600	142	81.43	60.00	100.00	100.00	100.00	100.00
KZOIL	177	64.29	80.00	60.00	83.33	93.94	69.23
d: Total alive stages							
MethadithionEC400	372	97.04	99.17	98.98	98.68	100.00	98.73
Actellic EC500	457	91.85	100.00	98.98	100.00	96.77	100.00
Buprofezin WP25	332	57.78	63.64	82.65	84.77	99.46	96.18
Diazinon EC600	264	72.59	99.17	97.96	98.68	100.00	99.36
KZOIL	312	49.63	68.60	23.47	92.72	84.41	70.06
e:*A.lepidosaphes*							
MethadithionEC400	2	98.46	50.00	50.00	50.00	83.33	80.00
Actellic EC500	3	86.15	50.00	50.00	0.00	83.33	80.00
Buprofezin WP25	8	55.38	50.00	50.00	50.00	83.33	80.00
Diazinon EC600	2	67.69	50.00	50.00	50.00	83.33	80.00
KZOIL	2	33.85	0.00	0.00	50.00	83.33	0.00
f: *A.enab* and *T. californicus*							
MethadithionEC400	0	100.00	100.00	100.00	92.86	100.00	100.00
Actellic EC500	0	100.00	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	0	94.12	100.00	85.19	78.57	100.00	100.00
Diazinon EC600	0	82.35	100.00	88.89	100.00	100.00	96.55
KZOIL	0	100.00	100.00	70.37	46.43	65.91	86.21



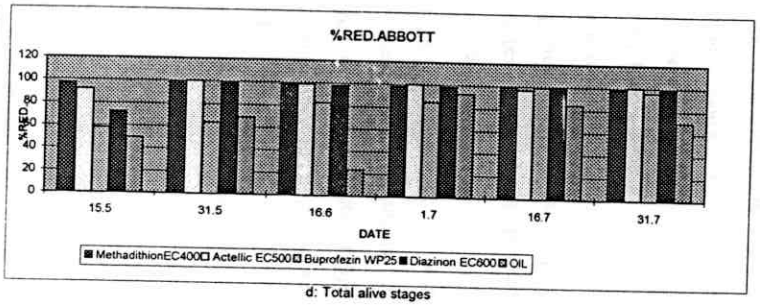
a:Preadult (N1+N2)



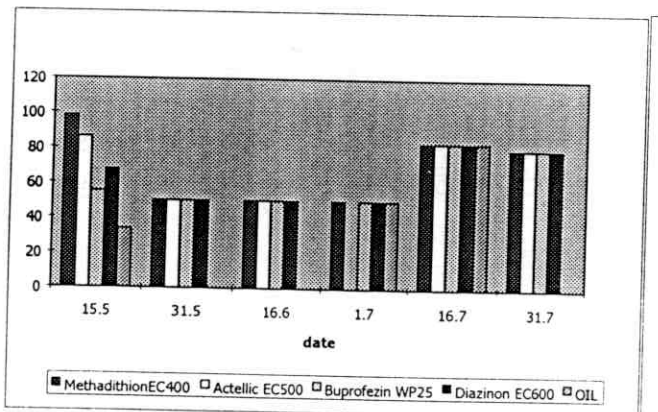
b: Adult females



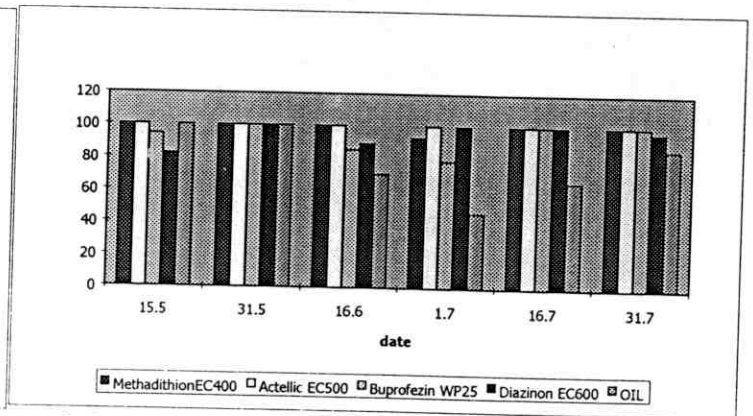
c : Ovipositing females



d: Total alive stages



e : ***A. lepidosaphes***



f : ***A. enab*** and ***T. californicus***

Fig (5) Reduction percentages of ***Cornuaspis beckii;*** and associated parasitoid, ***Aphytis lepidosaphes*** and predatory mite, ***Amblyseius enab*** & ***Tydeius californicus*** individual counts due to insecticidal application on April, 19th.1994 (Second experiment)

IV.1.c.Third experiment (one insecticidal application on March, 22nd 1995)

Methadithion, Actellic and Buprofezin were the assayed insecticides in this experiment and were apllied on March,22nd 1995.

The reduction percentages of ***Cornuaspis beckii*** (Newm.) in the total number of preadult stage (N1+N2), adult females, ovipositing females and total alive stages infesting 40 leaves, and of the parasitoid, ***Aphytis lepidosaphes***, and predatory mites, (***Amblyseius enab*** and ***Tydeius californicus***) after treatment by Methadithion, Actellic, and Buprofezin in 1995 are presented in Table (6) and Fig (6). Thirty days after treatments, the mentioned insecticides caused 92.3, 70.1 and 71.6% reductions, respectively in the total numbers of nymphs indicating highest efficacy of Methadithion than the two other insecticides.Thirty days later, the high efficacy of Methadithion decreased as the reduction rate reached 40.1%, although reincreased again to 98% after 15 days more and 100% 105 days after treatment. In case of Actellic and Buprofezin, the reduction percentages after 60 days from treatment reached 65 and 28.7% (lowest rate of reduction), respectively, but these percentages reincreased to 100% 75 days after treatment. At the end of the experiment (120 days after insecticidal application), no *C.beckii* nymph could be detected in cases of Methadithion and Buprofezin, and only 3% of the pretreatment count of nymphs was detected by using Actellic (97% reduction; Table, 6).

As for the effect on the adult females, Methadithion, Actellic and Buprotezin treatments caused 88.8, 80.5 and 65.7% reductions, respectively in the females population after 30 days from treatment. These percentages increased 15 days later in case of Actellic to reach 88.1%, but decreased to 48.5% reduction in cases of Methadithion and Buprofezin. However, at the end of the experiment (120 days after treatment, all the inspected leaves were free from any *C. beckii* infestation. (Table,6)

The reduction percentages in population of *C. beckii* ovipositing females number after treatments were 94, 83.6 and 82.1% for Methadithion, Actellic and Buprofezin, respectively. These percentages decreased to 45.2, 52.1 and 10.96% respectively 45 days after treatment, but reincreased again to reach 100% for Methadithion and Buprofezin and 96.8% for Actellic after 120 days from treatment

Concerning the reduction percentages of total alive stages of *C. beckii* after treatment, those reached 91.1, 75.9 and 71.8% on leaves of the first sample (30 days

after treatment by Methadithion, Actellic and Buprofezin, respectively. Fifteen days later, the % reduction decreased to 57.6 and 35.4% for Methadithion and Buprofezin and increased to 82.8% in case of Actellic. While, after 120 days of insecticidal treatments, no *C. beckii* individuals was detected in citrus leaves treated by Methadithion and Buprofezin, while high percentage reduction of 98.8 % was calculated in case of the Actellic treatment.

The treatment by Methadithion, Actellic, and Buprofezin caused complete (100 %) reduction of. ***A. lepidosaphes*** parasite population after 30 days of treatment The parasitoid could be detected after 45 and 60 days of treatment, but in low numbers as the percentages reduction in the parasitoid numbers were 63.33 & 40 83.33 & 90 and 83.33 & 50 % for the three insecticides, respectively. After that the parasitoid disappeared completely in the 4 subsequent samples up to 120 days after treatment. These results confirmed the drastic effect of the assayed insecticides on the natural role of ***A.lepidosaphes***.

Concerning the predacious mites (*A. enab* and *T. californicus*), treatments by Methadithion, Actellic and Buprofezin caused reductions in their population reached 94.7, 89.5 and 94.8 % after 30 days of treatment. While, as shown in Table (6), Buprofezin was the least effective on these mite species as it caused only 44 % reduction in population at the same period. Fifteen days later (45 days after treatment) the percentages reduction decreased to 33.3 and 50% in cases of Methadithion and Buprofezin treatments. At 60 days after treatment no predacious mite individual could be detected on leaves in treatments of Methadithoin. While, absence of predacious mite (100% reduction) occurred at 105 days after treatment in case of Methadithion (Table,6).

Table (6): Reduction percentage of *Cornuaspis beckii* and associated parasitoid, *Aphytis lepidosaphes* and predatory mites, *Amblyseius enab* & *Tydeius californicus* individual counts due to insecticidal application on March, 22nd. 1995 (Third experiment)

Inspection date		23.4	8.5	23.5	7.6	22.6	7.7	22,7.95
	pre spray count / 40 leaves							
		Reduction percentages after (...days)						
Days after treatment		30	45	60	75	90	105	120
a:Preadult (N1+N2)								
MethadithionEC400	331	92.28	68.88	40.13	97.96	90.99	100.00	100.00
Actellic EC500	738	70.06	85.37	64.97	100.00	90.09	97.40	96.77
Buprofezin WP25	505	71.60	25.27	28.66	100.00	97.30	100.00	100.00
b:Adult females								
MethadithionEC400	300	88.76	48.51	67.67	93.92	84.98	94.98	100.00
Actellic EC500	418	80.47	88.09	85.34	97.30	89.67	86.76	100.00
Buprofezin WP25	250	65.68	48.51	72.41	95.95	87.79	96.83	100.00
c:Ovipositing females								
MethadithionEC400	42	94.03	45.21	64.52	90.80	83.05	95.24	100.00
Actellic EC500	63	83.58	52.05	93.55	95.40	84.75	88.89	96.77
Buprofezin WP25	63	82.09	10.96	90.32	95.40	79.66	96.83	100.00
d: Total alive stages								
MethadithionEC400	747	91.11	57.60	56.99	95.91	87.57	98.08	100.00
Actellic EC500	1363	75.88	82.75	77.97	98.58	90.24	92.09	98.81
Buprofezin WP25	860	71.83	35.38	56.14	97.87	91.42	98.29	100.00
e:*A.lepidosaphes*								
MethadithionEC400	0	100.00	63.33	40.00	100.00	100.00	100.00	100.00
Actellic EC500	0	100.00	83.33	90.00	100.00	100.00	100.00	100.00
Buprofezin WP25	0	100.00	83.33	50.00	100.00	100.00	100.00	100.00
f: *A.enab* and *T. californicus*								
MethadithionEC400	7	94.74	33.33	100.00	92.86	85.71	100.00	77.78
Actellic EC500	0	89.47	83.33	82.76	89.29	85.71	68.97	66.67
Buprofezin WP25	5	94.74	50.00	93.10	78.57	90.48	100.00	77.78

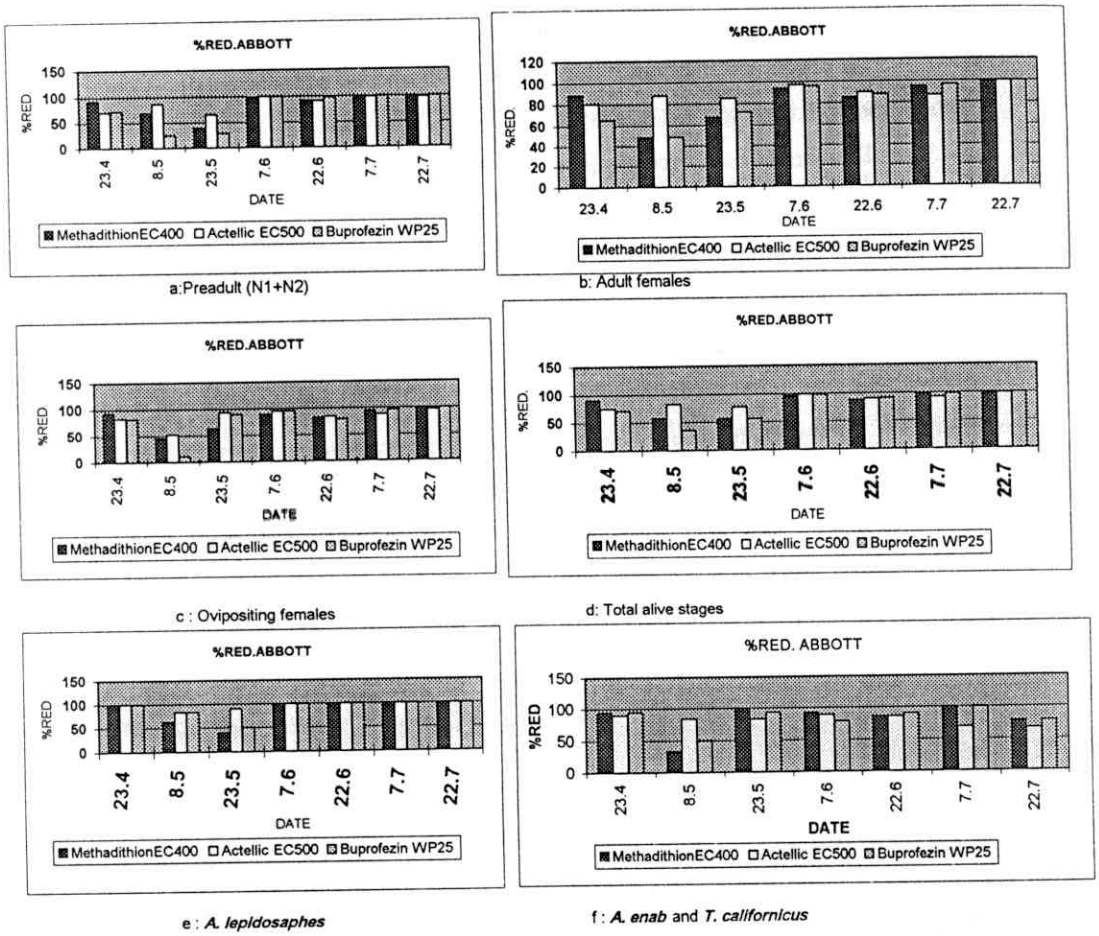


Fig (6) Reduction percentages of ***Cornuaspis beckii*** and associated parasitoid, ***Aphytis lepidosaphes*** and predatory mites, ***Amblyseius enab*** & ***Tydeius californicus*** individdual counts due to insecticidal application on March, 22nd.1995 (Third experiment).

IV.1.d.Fourth experiment (one insecticidal application on May, 8th 1995) :

Diazinon, Actellic and Buprofezin were the assayed insecticides in this experiment and were applied on May,8th 1995.

The reduction percentages of *C. beckii* total number of preadult stages (N1+N2), adult females, ovipositing females and alive stages infesting 40 of leaves of navel orange trees, the parasitoid ***Aphytis lepidosaphes***, and predatory mites, (***Amblyseius enab*** & ***Tydeius californicus***) after treatment by Diazinon, Actellic, and Buprofezin in 1995 are presented in Table (7) and Fig. (7). The percentage reduction of total number in nymphs population reached 93.3,44 and 86.6 % after 15 days of treatment by the three insecticides, respectively. These percentages reached to 51.1 after 30 days of Diazinon treatment, but increased to 98.4 and 89.7 % after Actellic and Buprofezin treatment Navel orange leaves were found free from *C. beckii* infestation 45 days after Actellic application, 60 days after Diazinon treatment and 120 days after Buprofezin treatment. At the end of experiment (135 days after insecticidal application), the reduction percentages in *C. beckii* nymphs population became 85.7, 41.1 and 92.9% in cases of Diazinon, Actellic and Buprofezin treatments.

After 15 days of Diazinon, Actellic and Buprofezin application on Navel orange trees, treatments led to 92.5, 66.3 and 86.1% reductions in *C. beckii*, adult females population. 15 days later, these percentages decreased to 74.7% in cases of Diazinon, but increased to 95.4 and 95% in case of Actellic and Buprofezin respectively. The highest percentage reduction reached 99.7% in adult females population was reached after 45 days of Actellic treatment, 99.3% after 120 days in case of Buprofezin and 95.5% after 105 days in case of Diazinon. While, at the end of the experiment, the recorded reduction percentages were 70.1, 88.3% and 55.8 after 135 days of treatment by Diazinon, Actellic and Buprofezin, respectively (Table.7).

As for the ovipositing female counts, data in Table (7) showed that these counts were reduced by 93.1, 62.1 and 44.8 after 15 days of Diazinon, Actellic and Buprofezin treatments, respectively. After more 15 days, these percentages decreased to 44.3 in case of Diazinon and increased to 88.6 and 72.9% in cases of Actellic and Buprofezin, respectively, but all reincreased to 81.3,100 and 78.8%, respectively at 45 days after treatment. No ovipositing female individual (100% reduction) could be

detected on citrus leaves after 45 days of Actellic application and 120 days of Buprofezin treatment. While, the percentages reduction never reached 100% throughout the whole period of experiment (135 days) by using Diazinon and reached a minimum of 14% after 75 days of application (Table,7).

Concerning the total population of alive stages in relation to different insecticidal treatments, data in Table (7) indicated that using Diazinon led to 92.6% reduction at 15 days after treatment. This percentage reduction decreased to 51.1% 15 days later, but this percentage reincreased to reach 83.6% and maximum of 98.4% after 45 and 60 days from treatment, respectively. By using Actellic, the reduction percentage in total population reach 57.3% after 15 days from treatment, increased to 95.7 after 30 days and to a maximum of 98.3% 45 days after treatment, and these percentages remained high afterwards up to 120 days after treatment (95.2%), but decreased greatly to reach 36.9% at the end of the experiment (135 days after treatment).As for Buprofezin application, the total number of alive stages was formed to be reduced by 84.8% at 15 days after treatment, increased to 90.2 and 88% after 30 and 45 days from treatment, and these percentages of reduction remained highest in the subsequent samples and reached a maximum of 99.6% at 120 days after treatment (Table,7).

As for the effect of insecticidal application for controlling ***C. beckii*** on population of the beneficial parasitoid ***A. lepidosaphes***, it is clear from Table (7) that had drastic effect on this parasitoid and no individual could be detected throughout the whole period of experiment (100% among all samples) in case of using Buprofezin. While, Diazinon and Actellic applications caused reduction percentages of 44.4 and 72.2%, respectively in the parasitoid population among the first sample (at 15 days after treatment). But, after 30 days from treatment the two insecticides caused complete absence (100% reduction after 45 days from treatment) and this absence of parasitoid remained in all the subsequent samples in case of Actellic, but the reduction percentage reached a minimum of 16.7 after 45 days of Diazinon treatment which reincreased to 100% in the sample collected 60 days after treatment.

Obvious effective occurred also on the predatory mites, ***A. enab*** and ***T. californicus*** due to insecticidal treatments as the recorded reduction in their population reached 59.4, 62.5 and 89.1% after 15 days of Diazinon, Actellic and

Buprofezin treatments. In case of Actellic, all the subsequent samples were completely, free from any predacious mite indicating drastic effect of this insecticide on the predacious mite individuals. The reduction % in predacious mite individuals at 30 days after treatment by Buprofezin and 60 days after application of Diazinon (Table,7).

Table (7) : Reduction percentages of ***Cornuaspis beckii*** and associated parasitoid, ***Ahytis lepidosaphes*** and predatory mite, ***Amblyseius enab & Tydeius californicus*** individual counts due to insecticidal applicatin on May, 8th.1995 (Fourth experiment)

Inspection date		23.5	7.6	22..6	7.7	22.7	6.8	21.8	5.9	20.9	5.10.95
		pre spray count / 40 leaves									
						Reduction percentages after (...days)					
Days after treatment		15	30	45	60	75	90	105	120	135	150
a:Preadult (N1+N2)											
Diazinon EC600	210	93.28	51.09	85.11	100.00	69.10	48.11	99.24	94.97	85.71	100.00
Actellic EC500	64	44.03	98.37	100.00	93.18	99.57	98.11	98.47	97.77	41.07	93.75
Buprofezin WP25	120	86.57	89.67	93.62	92.42	97.00	96.23	99.24	100.00	92.86	95.31
b:Adult females											
Diazinon EC600	143	92.51	74.69	82.88	98.12	72.56	79.59	95.52	92.91	70.13	94.74
Actellic EC500	75	66.31	95.44	99.66	95.77	96.28	94.56	93.53	95.04	88.31	96.49
Buprofezin WP25	149	86.10	95.02	87.67	89.20	91.16	94.56	92.04	99.29	55.84	85.96
c:Ovipositing females											
Diazinon EC600	33	93.10	44.29	81.25	95.24	13.95	67.09	97.83	86.49	84.62	96.67
Actellic EC500	15	62.07	88.57	100.00	95.24	88.37	94.94	89.13	81.08	69.23	70.00
Buprofezin WP25	35	44.83	72.86	78.75	82.54	80.23	98.73	95.65	100.00	61.54	73.33
d: Total alive stages											
Diazinon EC600	430	92.63	51.08	83.59	98.35	61.64	65.80	97.13	92.68	75.00	96.79
Actellic EC500	183	57.25	95.68	98.29	97.16	96.55	95.94	94.78	95.18	36.88	91.74
Buprofezin WP25	352	84.77	90.18	88.03	88.89	92.00	93.33	93.99	99.61	69.38	88.07
e:*A.lepidosaphes*											
Diazinon EC600	0	44.44	100.00	16.67	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Actellic EC500	0	72.22	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
f: *A.enab* and *T. californicus*											
Diazinon EC600	106	59.38	5.00	69.39	100.00	5.56	0.00	100.00	97.62	100.00	100.00
Actellic EC500	15	62.50	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	25	89.06	100.00	87.76	56.67	100.00	60.00	25.00	100.00	100.00	100.00

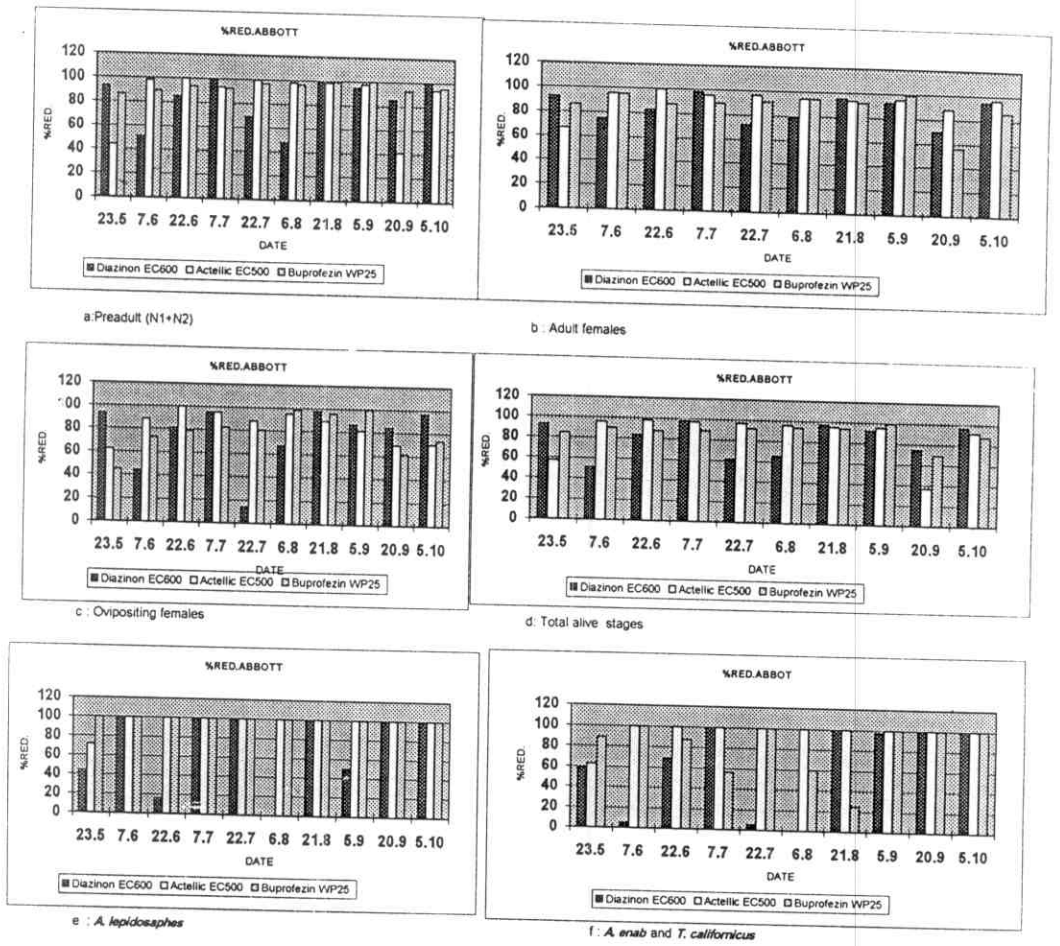


FIG.(7): Reduction percentage of *Cornuaspis beckii,* and *parasitoid, Aphytis lepidosaphes and* predatory mite, *Amblyseius enab & Tydeus californicus* individual counts due to insecticidal application on May, 8th 1995 (Fourth experiment)

IV.1.c.Fifth experiment (two insecticidal applications on June and August 1996):

The same insecticides used in the previous experiment were also applied in this experiment. Application of insecticides took place in two different areas (plots) in the same trial.

The first received spraying at once, on June,20th 1996 on three treatments; Diazinon, Actellic and Buprofezin. While, the second area received two applications, on August, 20th . 1996 on two treatments; Diazinon and Buprofezin. Data concerning the reduction percentages of ***Cornuaspis beckii*** total numbers of preadult stages (N1+N2), adult females, ovipositing females, and total alive stages infesting 40 leaves, and its parasitoid, ***Aphytis lepidosaphes***, after one application by Diazinon, Buprofezin and Actellic, and two applications by Diazinon and Buprofezin in 1996 are presented in Table (8) and Fig. (8).

One application of Diazinon, Actellic and Buprofezin caused 98,95 and 36.4% reductions in the numbers of ***C.beckii*** preadult stage (N1+N2) after 15 days of treatment (Table,8). Fifteen days later (30 days after treatment), these percentages were found to be reduced to 86,84 and 24.8%, respectively. While, no ***C. beckii*** preadult infestation was detected on the collected leaf samples at 45 days after treatment by Diazinon and after 60 days of Actellic treatment, and the reduction percentage reached a maximum of 99.7% at 105 days after 105 days of Buprofezin application. At the end of the experiment (120 days after one application), the reduction percentages in preadult's population reached 98.2, 98.8 and 89.4% for Diazinon, Actellic and Buprofezin treatments, respectively. In case of appling a second spray on August,20th (two months after the first spray), the reduction percentages in preadult counts reached 100 and 90.9 % at the same date of Diazinon and Buprofezin second spray. 15 days after second spray (75 days after first application), the reduction % were 100% and 98.6 %, respectively, and these percentages remained over 98% up to the end of experiment (98.8 and 100% afteer 120 days of first application by Diazinon and Buprofezin, respectively; Table,8).

As for the population of adult females, application of Diazinon, Actellic and Buprofezin led to 93.08, 1.8 and 100% reduction, respectively at 15 days after treatment and these percentages become 93.1, 88.9 and 18.1 %, respectively 15 days later. Complete reduction of adult females occurred after 15, 45 days of Actellic field

application, and after 105 days of Buprofezin application. While, after 120 days of one inseticidal application, the reduction percentages in ***C. beckii*** adult females population reached 80.9, 96.6 and 77.5 %, respectively due to Diazinon, Actellic and Buprofezin treatments, respectively. Another application of Diazinon, and Buprofezin on August, 20th led to 100% mortality adult females individuals after 30 days of second treatment by either of the two tested insecticides. While, at the end of the experiment, 45 days after second treatment the reduction percentages in adult females population were still high reading 93.3 and 98.9 %, respectively (Table,8 & Fig.8).

The ovipositing females count were found to be reduced by 64, 61.7 and 55.4% at 15 days after Diazinon, Actellic and Buprofezin treatments, respectively. However, one insecticidal application led to complete reduction of ***C. beckii*** adult female count after 45, 75 & 105 days of Diazinon applicaton, after 45, 60, 75 & 120 days of Actellic treatment and after 60 days of Buprofezin application. While, after 120 days of one insecticidal application, the reduction percentages in adult females population were 96.2, 100 and 90.4 % due to Diazinon, Actellic and Buprofezin treatments, respectively. By applying another insecticidal application, after 60 days of the first treatment, led to 100 and 92.6 % reduction due to second Diazinon and Buprofezin treatments, respectively at the day of application and these percentages reached 99 and 96 % 15 days later (90 days after first application). 45 days after second insecticidal application (120 days after first treatment), no alive individual of ***C. beckii*** adult female could be detected on leaves of the collected samples (100 % mortality due to Diazinon or Buprofezin treatment; Table,(8) and Fig.(8)

Diazinon one application caused above 90 % reduction in the biweekly counts of total alive stages individuals at all days after treatment except at 15 and 30 days that produced 87.4 and 86.5 %, respectively. Second application of Diazinon produced 100 % reduction at 15 days of second treatment, above 97 % reduction among alive stage individuals the remaining three samples. Buprofezin one and second application produced the same results as it caused low reduction at 15,30 days after treatment (29.3, 13.5) (62.6,34.9), respectively but this % increased to 99.06%at 105 days of first application. Actellic treatment caused 100% reduction at 75 days after treatment, above 95 % at all days, while it produced reduction percentages of 86.3, 74.6 at 15, 30days, respectively (fig 8).

Single application of Diazinon caused 100 % reduction of the parasitoid ***A. lepidosaphes*** population at 45, 75, 90 and 120 days after treatment, above 80 % at 15 and 105 days while it produced 76.9 and 66.7 % at 30 and 60 days, respectively. However second application of Diazinon on August, 20th caused 100 % reduction at the same day of second treatment (Table,8). Single application of Buprofezin caused 100 % reduction at 45days after treatment and the subsequent 30 days. While, another application of Buprofezin caused 100 % reduction in ***A. lepidosaphes*** population after 30 days of this treatment (105 days of first treatment). Actellic was applied in a single treatment on June, 20th. This insecticide appeared as the least effective on the parasitoid population as it caused 18.2 % reduction after 15 days from treatment (Table,8 & Fig. 8). However no effect of Actellic, on the parasitoid, could be detected among the samples collected at 45, 60 and 105 days after treatment.

Table (8) : Reduction percentages of *Cornuaspis beckii* and associated parasitoid, *Aphytis lepidosaphes* counts due to insecticidal application on (June,20th) and two applications on (June,20th and August,20th. 1996) (Fifth experiment)

Inspection date		5.7	20.7	5.8	20.8	5.9	20.9	5.10	20.10
		pre spray count / 40 leaves							
Days after treatment			Reduction percentage after (...days)						
		15	30	45	60	75	90	105	120
a:Preadult (N1+N2)									
					One application				
Diazinon EC600	533	98.03	85.92	100.00	93.64	97.18	99.50	97.99	98.22
Actellic EC500	206	95.08	83.98	99.81	100.00	100.00	95.52	95.30	98.82
Buprofezin WP25	305	36.39	24.76	73.36	97.27	94.37	98.51	99.66	89.35
					Two sprays				
Diazinon EC600	169	74.10	97.09	95.50	100.00	100.00	99.00	99.33	98.82
Buprofezin WP25	298	73.44	43.69	74.86	90.91	98.59	98.01	99.33	100.00
b:Adult females									
					One application				
Diazinon EC600	113	93.81	93.06	96.15	99.04	95.45	93.65	97.40	80.90
Actellic EC500	72	100.00	88.89	100.00	98.08	100.00	98.41	93.51	96.63
Buprofezin WP25	52	1.77	18.06	51.92	99.04	86.36	92.06	100.00	77.53
					Two sprays				
Diazinon EC600	89	95.58	76.39	71.15	100.00	100.00	98.41	100.00	93.26
Buprofezin WP25	77	70.80	36.11	61.54	99.04	95.45	96.83	100.00	98.88
c:Ovipositing females									
					One application				
Diazinon EC600	175	64.00	83.33	100.00	98.70	100.00	94.00	100.00	96.15
Actellic EC500	96	61.71	6.25	100.00	100.00	100.00	97.00	95.16	100.00
Buprofezin WP25	124	35.43	71.88	33.87	100.00	88.89	99.00	96.77	90.38
					Two sprays				
Diazinon EC600	52	77.71	90.63	87.10	96.10	100.00	99.00	99.19	100.00
Buprofezin WP25	124	38.29	0.00	68.55	92.21	92.59	96.00	98.39	100.00
d: Total alive stages									
					One application				
Diazinon EC600	821	87.44	86.49	99.72	96.13	96.51	96.34	98.49	92.08
Actellic EC500	374	86.28	74.59	99.86	99.35	100.00	96.34	95.29	95.89
Buprofezin WP25	481	29.26	13.51	65.18	98.71	86.05	96.80	99.06	84.46
					Two sprays				
Diazinon EC600	310	72.56	91.35	93.18	99.03	100.00	98.86	99.44	97.07
Buprofezin WP25	499	32.64	34.86	76.74	94.52	95.93	97.25	99.06	99.71
e:*A.lepidosaphes*									
					One application				
Diazinon EC600	7	81.82	76.92	100.00	66.67	100.00	100.00	85.71	100.00
Actellic EC500	2	18.18	38.46	0.00	0.00	50.00	33.33	0.00	50.00
Buprofezin WP25	12	0.00	53.85	100.00	100.00	100.00	83.33	71.43	100.00
					Two sprays				
Diazinon EC600	4	18.18	0.00	88.89	66.67	100.00	83.33	28.57	50.00
Buprofezin WP25	11	63.64	69.23	55.56	66.67	50.00	0.00	100.00	0.00

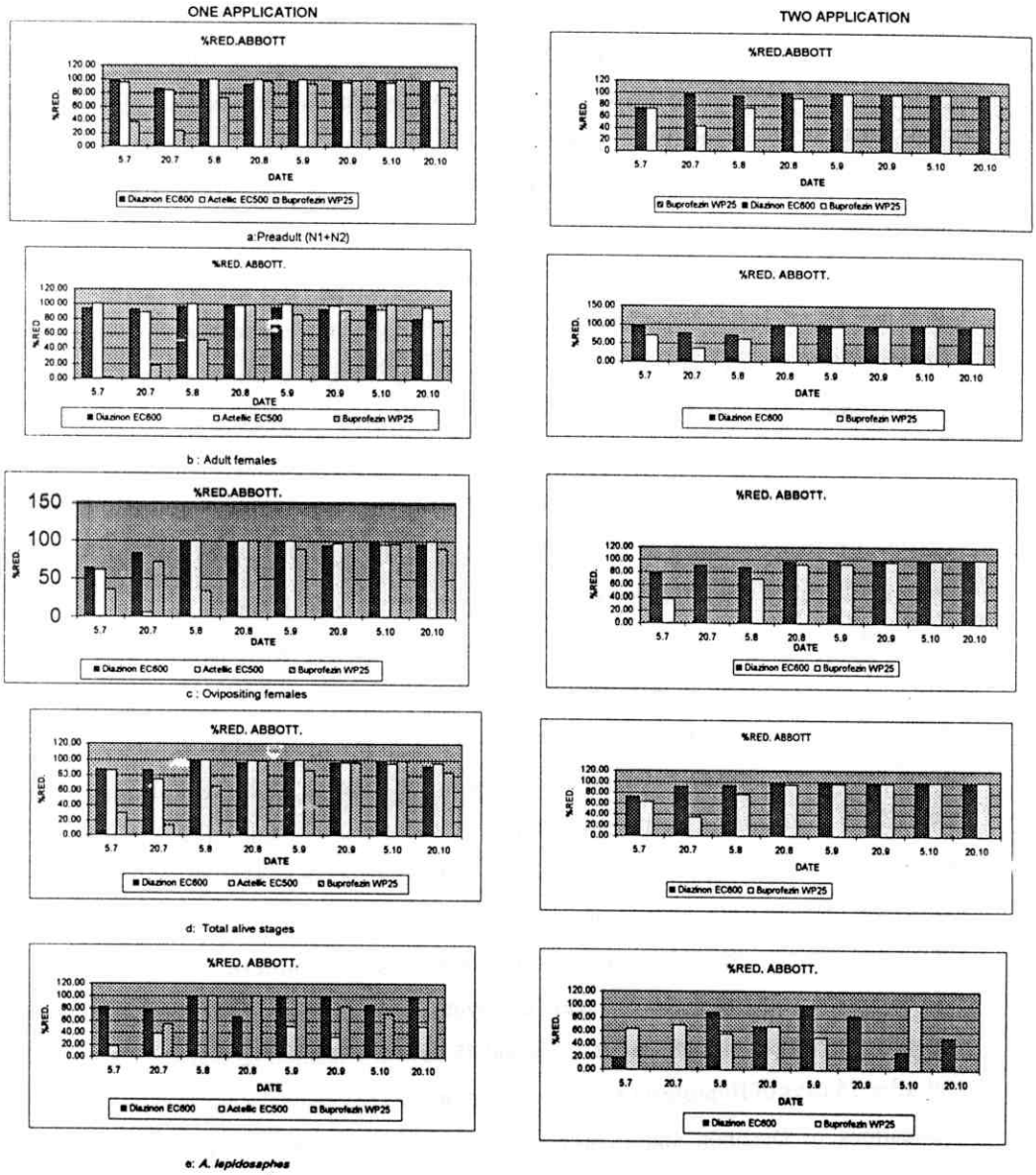


Fig. (8) : Reduction percentages of ***Comusaspis beckii*** and associated parasitoid, ***Aphytis lepidosaphes*** individual counts due to insecticidal application on (June,20th) and two applications on (June,20th and August,20th. 1996) (Fifth experiment)

IV.1.f. Sixth experiment (two insecticidal applications on June & July 1996):

The same insecticides used in the previous experiment were also applied in two areas in this experiment. The first area received one insecticidal application on June, 30th, while the second area received two applications on June, 30th and July, 30th 1996.

The reduction percentages of ***Cornuaspis beckii*** (Newm.) total number of preadult stages (N1+N2), adult females, ovipositing females and total alive stages infesting 40 leaves, and its parasite ***Aphytis lepidosaphes***, and predatory mite, (***Amblyseius enab*** & ***Tydeius californicus***) individuals after treatment by Diazinon, Buprofezin and Actellic, single application and Diazinon and Buprofezin two applications in 1996 are presented in Table (9) and Fig. (9). The reduction percentages of total number of preadult stages (N1+N2) 98.1 and 95.6 % after 15 days of Diazinon and Actellic treatments increased to 100 and 96.6 % 30 days later. However, Buprofezin was the least effective insecticide on *C. beckii* nymphs causing only 5.1 % reduction in population after 15 days of treatment, but this percentage increased successively until reached a maximum of 94.3 % reduction 45 days later (60 days after treatment). Maximum reduction % due to single application of Actellic reached 99.3 % after 75 days of treatment. At the end of treatment (at 120 days) single application of Diazinon, Buprofezin and Actellic led to 85.4, 19 and 48.1 % reductions, respectively in nymphal population (Table,9 & Fig. 9). As shown in the mentioned table, a second application of Diazinon and Buprofezin on July, 30th increased the reduction percentages of nymphal population. These reduction percentages reached 100 % after 15,30 and 45 days of Diazinon second application and after 75 days of Buprofezin second application. At the end of the experiment, two applications of Diazinon and Buprofezin led to reduction percentages in nymphal population reached 96.3 and 92.2 % respectively.

As for the effect of one and two insecticidal application on the populations of adult females infesting Navel trees, data in Table (9) and Fig. (9) indicate 96.6, 3.5 and 100 % reductions in this population after 15 days of treatment. Maximum percentages of reduction due to single application reached 98.8 and 89.7 % at 45 days after Diazinon and Buprofezin treatments, and 100 % after 15 days of Actellic treatment. At the end of experiment (120 days after single application), the reduction

percentages in ***C. beckii*** adult females population reached 89.1 and 87.6 and 97 %. respectively. Another treatment. 30 days after first treatment. by Diazinon and Buprofezin caused increases in reduction percentages of adult females than in case of single insecticidal application. Fifteen days after second treatment. the reduction percentages reached 98.8 and 92.1 %. respectively. However. these percentages reached 98.8 and 92.1 %. respectively. However, these percentages reached a maximum of 100 % after 60 and 90 days of Diazinon second treatment, and 97.1 at 75 days after Buprofezin treatment.

The ovipositing females population was found to be reduced by 84.1, 5.8 and 93.5 % after 15 days of spraying Diazinon, Buprofezin and Actellic on Navel trees. respectively and 78.8, 9.1 and 77.3 % 15 days later (Table.9 and Fig. 9). The reduction percentages reached 100 % at 45 days of Diazinon application. while the highest reduction percentages in ovipositing female counts were 91.6 and 98.7 % after 75 days of Buprofezin treatment and 45 days of Actellic treatment. respectively. A second spray by Diazinon led to more pronounced efficacy on the largest stage (ovipositing females) which disappeared completely (100 % mortality) after 30. 45 and 60 days of second spray (60, 75 and 90 days of first spray). While, the second spray of Buprofezin caused 77.4 % reduction after 15 days which increased to a maximum of 97.1 % after 75 days of second spray (105 days of first spray; Table.9 & Fig. 9). At the end of experiment (90 days after second spray). The percentages of reduction due to two sprays of Diazinon and Buprofezin were 96.2 and 94.2 %. respectively.

Concerning the biweekly counts of total alive stages. those were reduced by 93.5, 3.15 and 95.1 % after 15 days of Diazinon. Buprofezin and Actellic treatments, respectively. These percentages increased to their maximum of 99.6 % at 45 days after Diazinon treatment, 87 % after 60 days of Buprofezin treatment, and 98.1% at 75 days after Actellic application. At the end of experiment (120 days after treatment), the reduction percentages reached 87.6, 49 and 91.3 % after Diazinon, Buprofezin and Actellic treatments, respectively. By assaying two sprays of Diazinon and Buprofezin after 30 days of the first spray, The reduction percentages in total alive stage count increased to a maximum of 99.8% after 45 days of Diazinon second spray and 99.3% after 75 days of Buprofezin second spray (105 days after 1st application).

the end of the two applications · experiment, the reduction percentages of *C. beckii* total alive stages reached 97.7 and 95.1 % due to two sprays of Diazinon and Buprofezin, respectively (Table,9 & Fig. 9).

Diazinon, Buprofezin and Actellic first application caused 100 % reduction of. ***A. lepidosaphes*** parasite population at 45 days. Percent reduction was 75% and above at all days except at 15 days that produced 57.14 % reduction as a result of Diazinon first application. However second application of Diazinon caused the lowest percent reduction of 25 % at 105 days other reduction ranged from 8.33 % at 120 day to 80 % at 75 days. First application of Buprofezin caused population reduction ranged from 4.35 % at 60 days to 100 % at 45 days. While second application caused percent reduction ranged from - 50 % at 105 days to 95.65 at 60 days. Actellic treatment caused percent reduction of 100 % at 45 and 120 days, 95.65 % at 60 days, 70 % at 75 days, 50 % at 90 days and 42.86 % at 15 days (Table 9and fig 9e)

Diazinon first application treatment produced 90.91% population reduction of predatory mite, ***A. enab*** & ***T. californicus*** at 60 days and above 85 % at 15, 30 and 45 days and above 40 % at 105 and 120 days, respectively. Diazinon second application caused a reduction percentage that ranged from 0.0 % at 45 days to 92.31 % at 75 days. Buprofezin first application produced percent reduction ranged from 28.57 % at 105 days to 81.82 % at 60 days. Second application of Buprofezin caused the lowest reduction percentage of - 20 at 15 days, while it produced percentage reduction ranged from 46.67 to 84.62 % at all other days. Treatment by Actellic caused above 70 % at 15 and 30 days, above 60 % at 45, 60, 90 and 120 days. The lowest reduction produced by Actellic was 14.29 at 105 days (Table 9 and fig 9f)

Table (9) : Reduction percentages of ***Cornuaspis beckii*** and associated parasitoid, ***Aphytis lepidosaphes*** and predatory mites, ***Amblyseius enab*** & ***Tydeius californicus*** indiviudal counts due to one insecticidal application on (June,30th) and two applications on (June,30th and July, 30th. 1996) (sixth experiment)

Inspection date		15.7	30.7	14.8	29.8	13.9	28.9	13.10	28,10.96
		pre spray count / 40 leaves							
					Reduction percentages after (...days)				
Days after treatment		15	30	45	60	75	90	105	120
a:Preadult (N1+N2)					**One application**				
Diazinon EC600	168	98.10	97.92	100.00	98.10	97.67	88.24	90.99	85.82
Buprofezin WP25	414	5.06	20.05	78.79	94.30	82.67	72.69	48.73	19.03
Actellic EC500	165	95.57	93.49	96.63	93.67	99.33	78.99	80.85	48.13
					Two sprays				
Diazinon EC600	267	77.85	98.96	100.00	100.00	100.00	99.58	97.46	96.27
Buprofezin WP25	260	3.16	53.39	72.39	95.57	99.33	94.96	100.00	92.16
b:Adult females					**One application**				
Diazinon EC600	162	96.55	97.14	98.81	97.78	98.85	89.09	56.52	89.11
Buprofezin WP25	217	3.45	65.71	89.72	75.56	49.43	60.00	27.54	87.62
Actellic EC500	109	100.00	86.67	98.81	90.00	93.10	78.18	40.58	97.03
					Two sprays				
Diazinon EC600	118	89.66	98.10	98.81	98.89	98.85	100.00	98.55	100.00
Buprofezin WP25	105	17.24	74.29	92.09	86.67	85.06	83.64	97.10	96.04
c:Ovipositing females					**One application**				
Diazinon EC6(	196	84.06	78.79	100.00	98.80	97.89	85.33	72.06	71.15
Buprofezin WP25	173	5.80	9.09	70.32	89.16	91.55	46.67	23.53	26.92
Actellic EC500	154	93.48	77.27	98.71	96.39	98.59	78.67	89.71	92.31
					Two sprays				
Diazinon EC600	243	49.28	95.45	99.35	100.00	100.00	100.00	95.59	96.15
Buprofezin WP25	149	9.41	16.67	77.42	93.98	93.66	85.33	97.06	94.23
d: Total alive stages					**One application**				
Diazinon EC600	526	93.47	96.05	99.61	97.69	97.94	87.43	82.69	87.64
Buprofezin WP25	805	3.15	25.00	82.23	87.03	75.61	65.97	48.78	49.00
Actellic EC500	448	95.05	90.63	97.92	96.25	98.12	78.53	93.01	91.34
					Two sprays				
Diazinon EC600	649	99.10	98.52	99.71	99.71	99.81	99.74	97.20	97.68
Buprofezin WP25	521	0.90	51.97	79.77	93.08	95.50	91.62	99.30	95.05
e:*A.lepidosaphes*					**One application**				
Diazinon EC600	26	57.14	88.24	100.00	82.61	90.00	75.00	75.00	75.00
Buprofezin WP25	19	50.00	44.12	100.00	4.35	60.00	12.50	25.00	50.00
Actellic EC500	12	42.86	79.41	100.00	95.65	70.00	50.00	50.00	100.00
					Two sprays				
Diazinon EC600	29	42.86	35.29	37.50	21.74	80.00	25.00	25.00	8.33
Buprofezin WP25	12	42.86	-8.82	93.75	95.65	80.00	50.00	-50.00	16.67
f : *A.enab* and *T. californicus*					**One application**				
Diazinon EC600	1	86.67	86.67	87.50	90.91	76.92	72.73	42.86	45.45
Buprofezin WP25	5	80.00	80.00	75.00	81.82	38.46	45.45	28.57	36.36
Actellic EC500	6	73.33	86.67	62.50	63.64	53.85	63.64	14.29	63.64
					Two sprays				
Diazinon EC600	19	60.00	80.00	0.00	72.73	92.31	45.45	71.43	72.73
Buprofezin WP25	2	-20.00	46.67	50.00	54.55	84.62	54.55	57.14	54.55

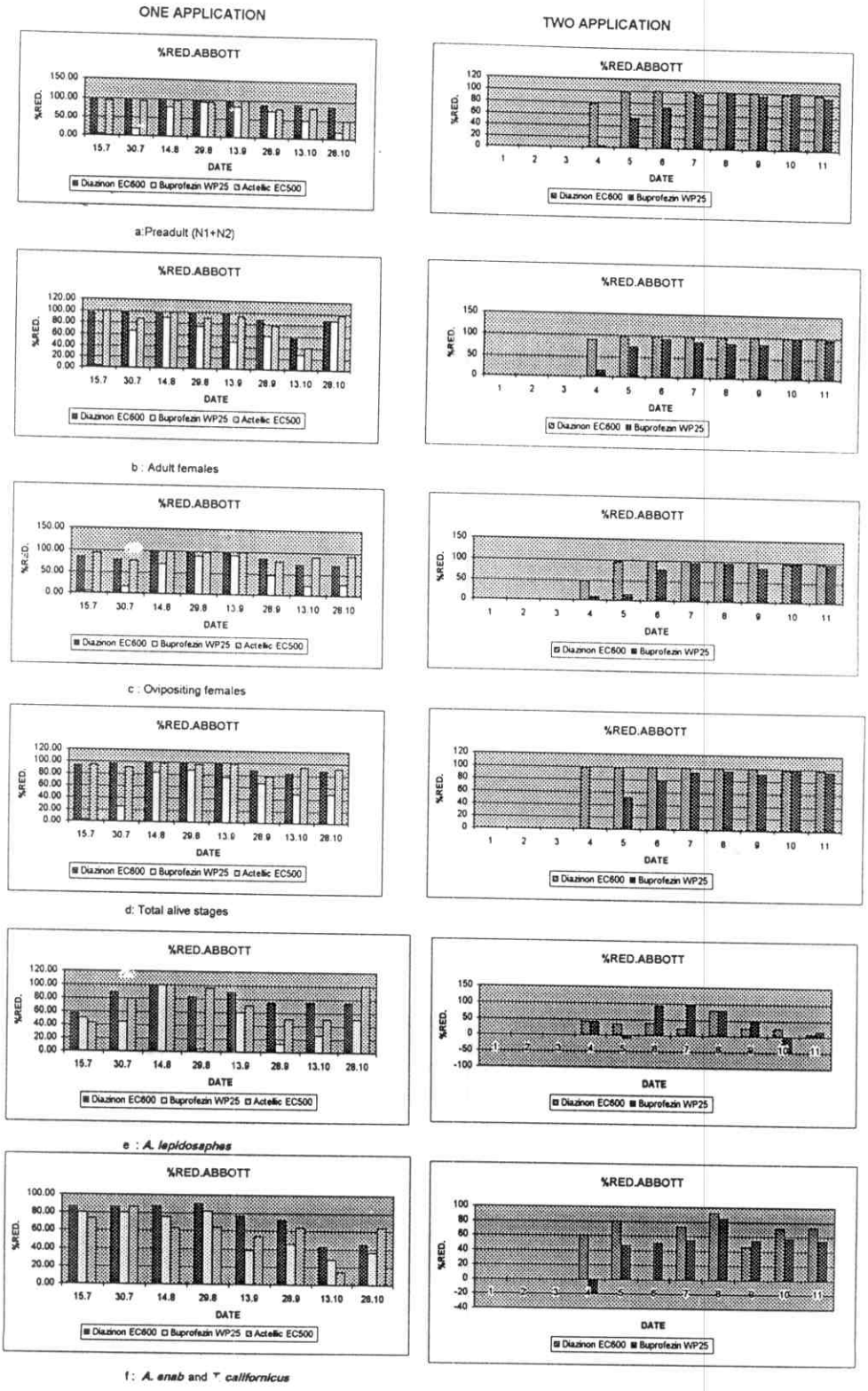


Fig. (9) : Reduction percentages of ***Cornuaspis beckii*** and associated parasitoid, ***Aphytis lepidosaphes*** and predatory mite, ***Amblyseius enab.*** & ***Tyoelus californicus*** individual counts due to one insecticidal application on (June,30) and two applications on June,30 & July,30, 1996 (Sixth experiment).

IV.2.Efficiacy of the insecticides against date palm scale insect, *Parlatoria blanchardii* (Targ.).

IV.2.a. First experiment (one insecticidal application on April, 1995):

In this experiment, 3 insecticides, Diazinon, Actellic and Buprofezin were applied on Valencia citrus trees only once on April, 24th . 1995.

The percentages reduction of ***Parlatoria blanchardii*** (Targ.) in the total number of preadult (N1+N2), adult females, ovipositing females and alive stages infesting 40 branches post treatment by Diazinon, Actellic, and Buprofezin in 1995 are presented in (Table 10 & Fig 10). The percentage reduction of total number preadult (N1+N2) stages were above 90 % after treatment due to application of Diazinon and Actellic at 60, 75 and 90 days, while it produced 8.33, 49.88 & 84.78 % and 36.6, 84.6 & 92.8% reduction at 15, 30 and 45 days for Diazinon and Actellic respectively (Fig 10a). Buprofezin produced percentage reduction of 6.3, 38.7, 52.9, 95.1, 82.1 and 88.1% at 15, 30, 45, 60, 75, and 90 days. The lowest reduction of 6.3 % was produced at 15 days in case of Buprofezin (Table 10).

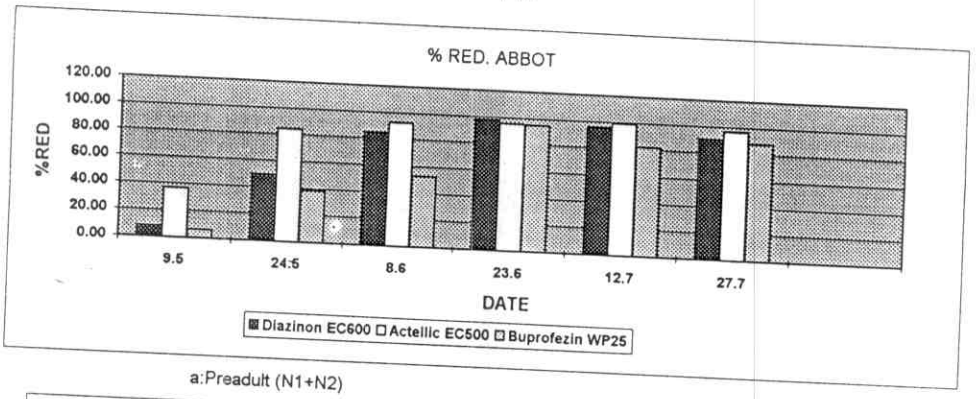
The highest adult females reduction percentages were above 90 % after treatment by Diazinon at 45, 60 and 75 days after treatment (Fig 10b). However treatment with Diazinon produced percentage reduction of 34.17, 40.72 and 89.75 at 15, 30 and 90 days. The lowest adult female reduction percentage was 33.25 at 15 days in case of Actellic. However, Actellic and Buprofezin treatment produced percentage reduction of 33.25, 56.11, 84.49, 83.85, 97.44% & 93.03 and 18.55, 74.75, 43.55, 69.69 69.87% & 81.56 at 15, 30, 45, 60, 75 and 90 days after treatment (Table10) .

The percentage reduction of the ovipositing females of ***P. blanchardii*** after treatment with Diazinon was above 90 % at 60, 75 and 90 days, while it produced 6.98, 18.42 and 70.31 at 15, 30 and 45 days, respectively. However, Actellic and Buprofezin treatment produced percentage reduction of 39.68, 50, 76.56, 62.77, 95.67% & 84.41 and 42.86, 21.05, 29.69, 16.79, 76.19& 67.74 % at 15, 30, 45, 60, 75 and 90 days after insecticidal application, respectively (Table 10). The lowest percentage reduction of 6.98 was produced at 15 days in case of Diazinon.

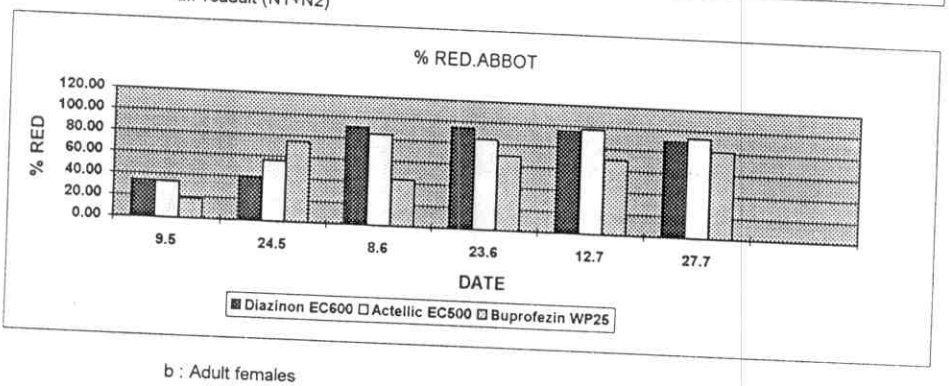
The total number of the considered stages for inspection on Valencia citrus trees was above 90 % in this population after treatment by Diazinon at 60 and 75 days of treatment, it produced 22.46, 34.25, 86 and 89.99% after 15, 30, 45 and 90 days, respectively. Actellic produced percentage reduction above 90 % at 75 and 90 days, it produced 35.1, 61.03, 80.78 and 81.77% at 15, 30, 45 and 60 days, respectively (Table 10). However, Buprofezin treatment produced percentage reduction of 16.98, 44.33, 14, 67.03 76.12 and 79.21% after15,30, 45, 60, 75 and 90 days, respectively (Table 10). The lowest percentage reduction of 16.98 % was produced at 15 days in case of Buprofezin.

Table (10) : Reduction percentages of ***Parlatoria blanchardii*** individual counts due to insecticidal application on April,24th. 1995 (First experiment)

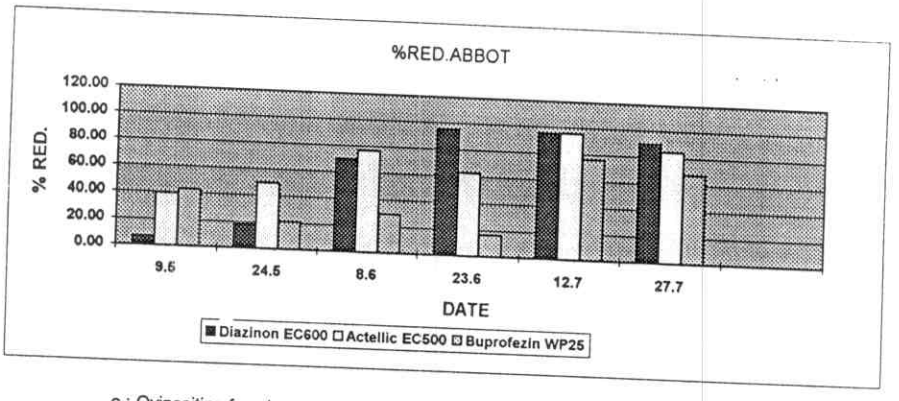
Inspection date		9.5	24.,5	8..6	23..6	12.7	27.7.95
	pre spray count / 40 branches						
		Reduction percentages. after (...days)					
Days after treatment		15	30	45	60	75	90
a:Preadult (N1+N2)							
Diazinon EC600	1875	8.33	49.88	84.78	98.08	95.91	90.73
Actellic EC500	1325	36.60	84.60	92.80	95.50	99.10	96.50
Buprofezin WP25	615	6.30	38.70	52.90	95.10	82.10	88.10
b:Adult females							
Diazinon EC600	1345	34.17	40.72	91.07	94.48	95.51	89.75
Actellic EC500	1300	33.25	56.11	84.49	83.85	97.44	93.03
Buprofezin WP25	580	18.55	74.57	43.55	69.69	69.87	81.56
c:Ovipositing females							
Diazinon EC600	725	6.98	18.42	70.31	95.62	95.67	90.32
Actellic EC500	420	39.68	50.00	76.56	62.77	95.67	84.41
Buprofezin WP25	375	42.86	21.05	29.69	16.79	76.19	67.74
d: Total alive stages							
Diazinon EC600	3945	22.46	34.25	86.00	94.99	96.33	89.99
Actellic EC500	3015	35.07	61.03	80.78	81.77	98.04	92.46
Buprofezin WP25	1570	16.98	44.33	14.00	67.03	76.12	79.21



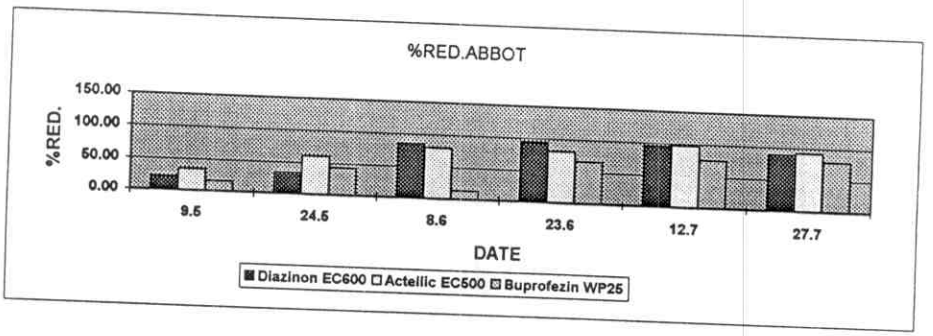
a:Preadult (N1+N2)



b : Adult females



c : Ovipositing females



d: Total alive stages

FIG (10) : Reduction percentages of ***Parlatoria blanchardii*** individual counts due to insecticidal application on April, 24th.1995 (First experiment)

IV.2.b.Second experiment (one insecticidal application on May, 1995):

Actellic Basudin (Diazinon) and Buprofezin were the assayed insecticides in this experiment and were applied on May, 2nd ,1995.

The reduction percentages in ***Parlatoria blanchardii*** total number of preadult stages (N1+N2), adult females, ovipositing females and alive stages infesting 40 branches after treatment by Actellic, Basudin (Daizinon) and Buprofezin in 1995 are presented in (Table 11 & Fig 11). The percentage reduction in total number of preadult stages reached 100 % after treatment with Actellic at 60, 105 and 120 days after treatment, while it produced above 90% at all days after treatment except at 30,45 and 135 days as it produced 78.4, 89.3 and 80.5, respectively (Fig 11a).Basudin (Diazinon) produced reduction percentage of 100 % at 60, 90, and 120 days, while it produced above 95% at all days except after 15 days of treatment as it produced 62.70% reduction in preadult stage monthly (Fig 11a). However Buprofezin treatment caused 100 % reduction at 105 days only, while it produced 66.92, 86.2% reductions in preadults mortality after 15, 30 days of treatment and more than 90% reduction at all the remaining period of experiment (Fig.11a), The lowest percentage reduction in mean count of preadults 62.7% occurred after 15 days of Basudin (Diazinon) treatment (Table,11).

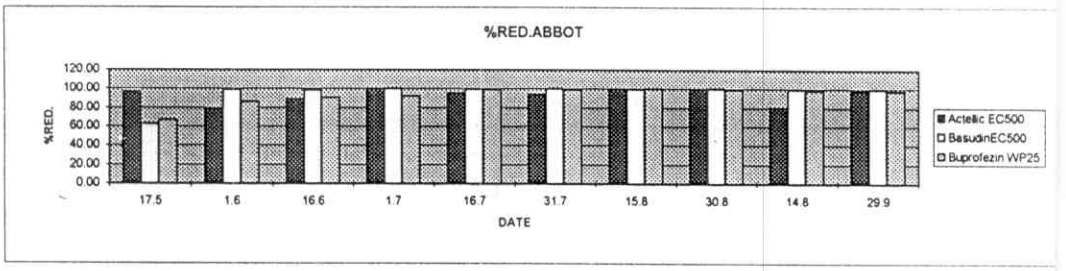
As for the ***P.blanchardii*** adult female counts, those were reduced by more than90 % following treatment by Actellic at all days except at 30, 75 and 135 days which showed reduction percentages of 71.4, 86.8 and 81.0%, respectively (Fig 11b). However treatment with Basudin (Diazinon) produced percentage reduction above 90 % at all days except at 15,45 and 150 days after treatment that showed reduction percentages of 45.0, 86.8 and 85.6%, respectively (Fig 11b). Buprofezin treatment produced reduction percentages above 90 % at 75, 90, 105, 120 and 150 days after treatment, less than 80% after 15,30 &45 days from treatment, and 83.2, 83.6 at 60, 135 days after treatment, respectively. It is clear also from Table (11) that the lowest reduction in adult females count (45.0%) was estimated after 15 days of Basudin (Diazinon) application.

The reduction percentages of ***P. blanchardii*** ovipositing females reached more than90 % at all days after Actellic treatment except at 30, 75, and 135 days which the estimated reductions were 79.4, 88.9 and 86.3%, respectively (Table, 11). Basudin (Diazinon) treatment produced 59.2, 66.7 % reductions in ovipositing female numbers after 15, 150 days of treatment, while this percentage reached a maximum of 100% after 60, 105 days of treatment and above 90 reductions among all the remaining samples (Table 11). However, Buprofezin treatment produced above 90 % reductions at 75, 90, 105 and 120 days after treatment, while it produced reduction percentage of 70.6, 79.4, 81.3, 87.7 , 83.3 and 77.8% at 15, 30, 45, 60, 135 and 150 days respectively (Fig 11c). The lowest percentage reduction was estimated by 59.2% and occurred after 15 days in case of Basudin (Diazinon) treatment.

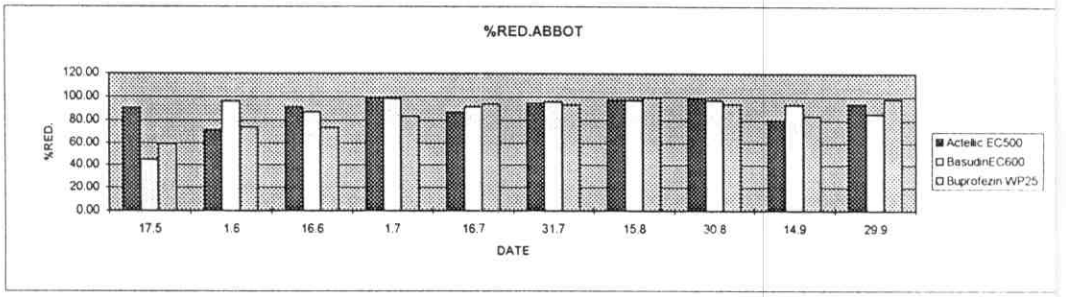
Actellic application caused more than 90% of the alive stages at all days after treatment except at 30,135dthat showed reduction percentages 74.8, 81.9% But Basudin (Diazinon) reached the same reduction level at all days except the first and the last inspection (55.2 and 87.3%, respectively; Table 11). However, Buprofezin treatment produced percentage reduction above 90 % at 75, 90, 105 and 120 days, while the percentage reduction ranged between 63.5% after days to 87.7% after 60 days of treatment, among the remaining samples, (Fig 11d). The lowest percentage reduction of 55.2 % was recorded at 15 days after Basudin (Diazinon), treatment.

(11): Reduction percentages of ***Parlatoria blanchardii*** individual counts due to insecticidal application on May, 2nd.1995 (second experiment)

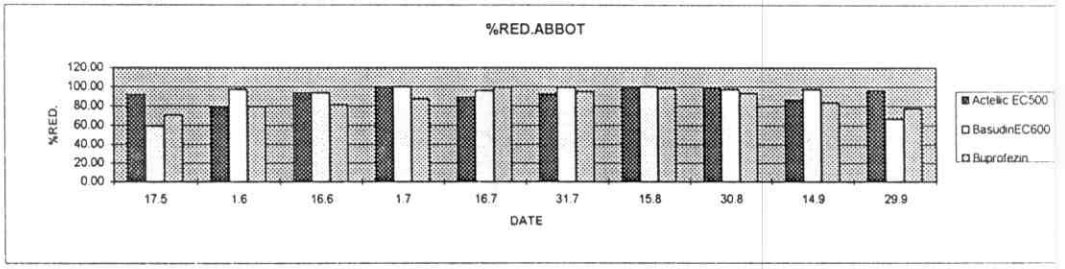
ction date		17.5	1.6	16.6	1.7	16.7	31.7	15.8	30.8	14.8	29.9.1995
		Pre spray count / 40 branches									
				Reduction percentages after (...days)							
after treatment		15	30	45	60	75	90	105	120	135	150
eadult (N1+N2)											
ic EC500	119	96.65	78.41	89.32	100.00	95.69	94.89	100.00	100.00	80.47	98.28
dinEC500	80	62.7	99.1	98.5	100.0	99.5	100.0	99.8	100.0	99.8	99.6
fezin WP25	125	66.9	86.2	90.7	92.4	98.9	99.4	100.0	99.1	98.3	97.8
dult females											
ic EC500	146	90.64	71.38	91.53	98.85	86.76	94.79	97.75	98.47	80.28	94.23
dinEC600	99	45.00	95.96	86.78	98.66	91.55	95.95	97.11	97.19	93.43	85.56
fezin WP25	136	58.85	73.74	73.14	83.21	94.06	93.24	99.36	93.86	83.57	98.16
ipositing females											
ic EC500	105	91.91	79.41	93.75	100.00	88.89	92.39	100.00	98.61	86.27	96.30
dinEC600	35	59.15	97.06	93.75	100.00	95.83	99.49	100.00	97.22	97.06	66.67
fezin WP25	87	70.64	79.41	81.25	87.71	99.31	94.92	98.51	93.06	83.33	77.78
tal alive stages											
ic EC500	424	93.73	74.83	91.11	99.59	90.39	94.42	98.74	98.81	81.91	95.91
dinEC600	215	55.23	97.24	90.33	99.52	94.77	97.96	98.02	98.07	96.14	87.31
fezin WP25	348	63.54	75.58	72.11	87.50	95.62	94.98	99.46	94.37	85.98	87.73



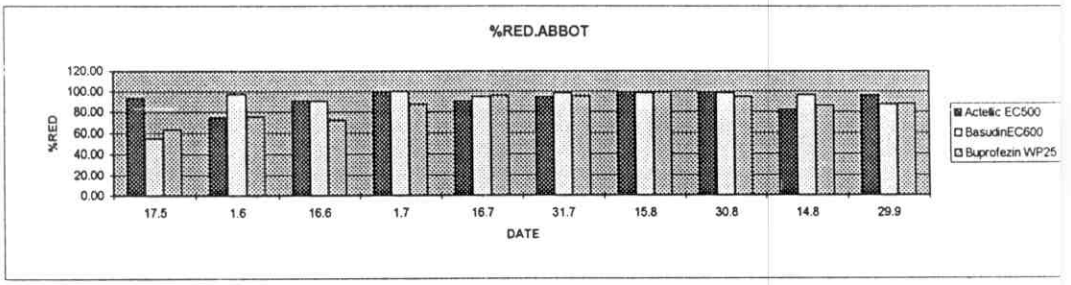
a:Preadult (N1+N2)



b : Adult females



c : Ovipositing females



d: Total alive stages

Fig. (11): Reduction percentages of ***Parlatoria blanchardii*** individual counts due to insecticidal application on May, 2nd.1995 (second experiment)

IV.2.c.Third experiment (one insecticidal application onMay, 1996):

Diazinon and Buprofezin were the only assayed insecticides in this experiment, and were applied on May, 21st 1996.

The percentages reduction of ***Parlatoria blanchardii*** in the total number of preadults (N1+N2), adult females, ovipositing females and alive stages infesting 40 branches after treatment by Diazinon and Buprofezin in 1996 are presented in Table (12) and Fig. (12). Diazinon application caused complete reduction of nymphal stage as no individual could be detected on the examined leaves at all days after treatment except at 15 days after treatment when the percentage reduction was 71.4% (Fig 12a). Buprofezin, on the other hand, produced complete reduction (100 %) at 45 and 75 days while it produced percentage reduction of 16.7, 35.3, 99.2 and 98.9% at 15, 30, 60 and 90 days after treatment, respectively (Fig 12a). The lowest reduction of 16.67 % occurred after at 15 days from of Buprofezin treatment (Table 12).

Highest reduction % in the adult females counts occurred due to Diazinon application which caused 100% reduction at 45,60 and 90 days after treatment.The remaining 3 inspection showed reduction percentages of 45.7, 93.9 and 97.8% at 15, 30 and 75 days after treatment, respectively. Buprofezin produced percentage reduction above 90 % at 45 and 60 days while it produced a very low percentage of 11.4 reduction after 15 days of treatment, increased to, 54.6, 82.2 and 83.8% at, 30, 75 and 90 days, respectively (Fig 12b).

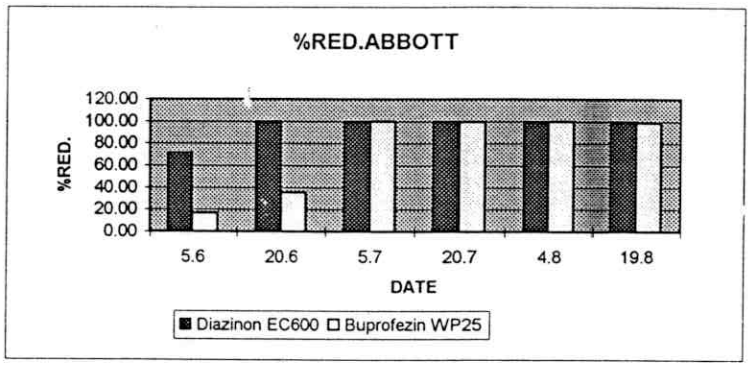
The percentage reduction of ***P. blanchardii*** ovipositing female counts after treatment with Diazinon was 100 % at 30 days and this complete protection extended up to the end of the experiment (90 days after treatment), while it led to 25% after 15 days of treatment. However, Buprofezin treatment produced reduction percentages of 12.5& 44.4, after 15& 30 days of treatment. These percentages increased to 93.3, 98.5 and 96.4 and 95.7% after 45, 60, 75 and 90 days of treatment (Table,12),. The lowest percentage reduction of 12.5 % was produced at 15 days in case of Buprofezin.

The total alive stages reduction percentage of ***P. blanchardii*** after treatment with Diazinon was 100 % at 45, 60 and 90 days, it produced 64.2, 96.6 and 99.8% at 15, 30 and 75 days after treatment, respectively. While, Buprofezin treatment produced reduction percentages of 23.6, 47.5, at 15& 30 days after treatment, while, these percentages increased to reach more than 90% throughout the remaining period

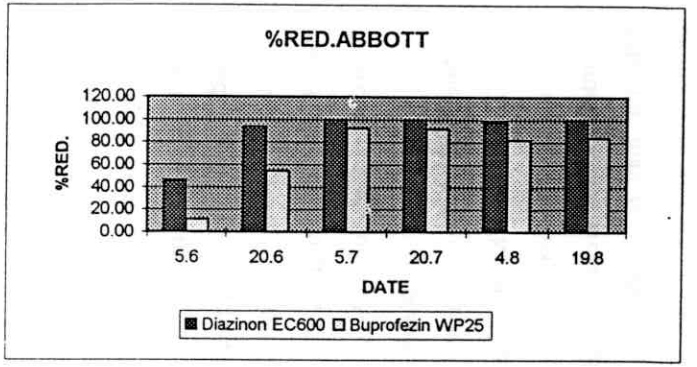
Table (12) Reduction percentages of ***Parlatoria blanchardii*** individual counts due to insecticidal application on May, 21st. 1996 (third experiment)

Inspection date		5.6	20.6	5.7	20.7	4.8	19.8.1996
	Pre spray count / 40 branches	Reduction percentages after (...days)					
Days after treatment		15	30	45	60	75	90
a:Preadult (N1+N2)							
Diazinon EC600	61	71.43	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	47	16.67	35.29	100.00	99.19	100.00	98.86
c:Ovipositing females							
Diazinon EC600	50	25.00	100.00	100.00	100.00	100.00	100.00
Buprofezin WP25	62	12.50	44.44	93.33	98.53	96.36	95.74

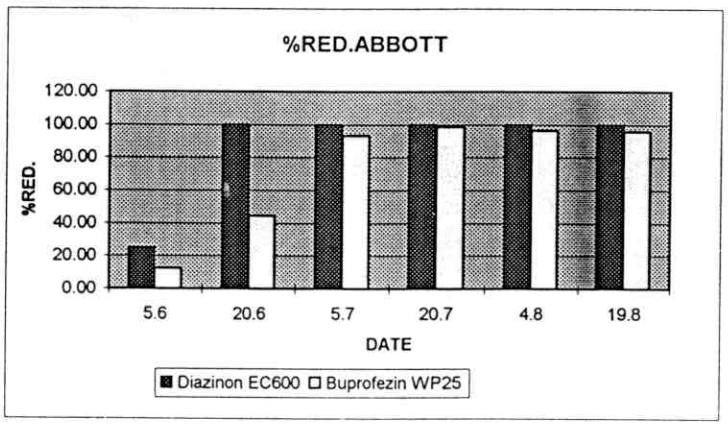
		5.6	20.6	5.7	20.7	4.8	19.8
	Pre spray count / 40 branches	Reduction percentages after (...days)					
		15	30	45	60	75	90
b:Adult females							
Diazinon EC600	94	45.71	93.94	100.00	100.00	97.78	100.00
Buprofezin WP25	84	11.43	54.55	92.41	92.05	82.22	83.78
d:Tota alive stages							
Diazinon EC600	205	64.15	96.61	100.00	100.00	99.75	100.00
Buprofezin WP25	195	23.58	47.46	96.39	97.70	96.99	94.86



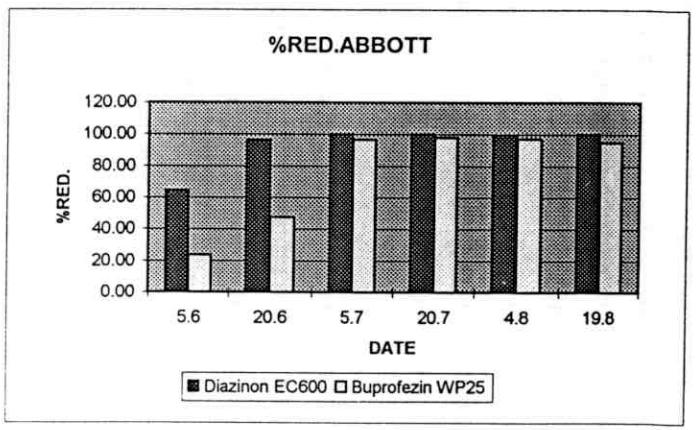
a:Preadult (N1+N2)



b:Adult females



c : Ovipositing females



d:Total alive stages

of experiment (Table,12 and Fig. 12).

IV.2.d. Fourth experiment (one insecticidal application on July, 1996):

The reduction percentages in ***Parlatoria blanchardii*** total number of preadult individuals (N1+N2), adult females, ovipositing females and total alive stages infesting 40 branches after treatment by Dimethoate, kz oil, Anthio, Malathion, Basudin, and Selecron in 1996 are presented in Table (13) and Fig (13). Spraying of Dimethoate caused reduction percentages in the total number of preadult (N1+N2). Those reached a maximum of 61.5% after 45 days and a minimum of 28.8% after 60 days of treatment. Those caused by KZ oil ranged from 56.2% after 15 days of treatment to 83.8% at 45 days. While reductions in the nymphal stage individuals due to spraying by Anthio, Malathion, Basudin and Selecron were 89.2-97.8, 83.2-98.4, 81.9-98.6 and 96.8-99%, respectively (Table,13 and Fig.13). It is clear from the presented figures that the lowest reduction percentage (28.8%) was recorded after 60 days of Dimethoate treatment, while the highest percentage (99%) occurred after 75 days of Selecron treatment (Table,13).

The reduction percentages in adult female counts due to insecticidal treatments ranged between the minimum of 41.2, 53.5, 83.2, 82.1, 83.6 and 93% to the maximum of 69.9, 79.1, 94.3,95.8, 98.2 and 97.8 % after spraying of Dimethoate, KZ oil, Anthio, Malathion, Basudin and Selecron, respectively. The lowest reduction percentage in adult female counts (41.2%) occurred after 60 days of Dimethoate treatment, while the highest percentage (98.2%) was recorded after 60 days of Basudin application. It could be also observed from Fig. (13) that Selecron treatment caused more than 93% reductions at all inspections after treatment, and that Anthio and Basudin treatments led to more than 91% reductions after 30 days and all the subsequent inspections (table,13 and Fig. 13).

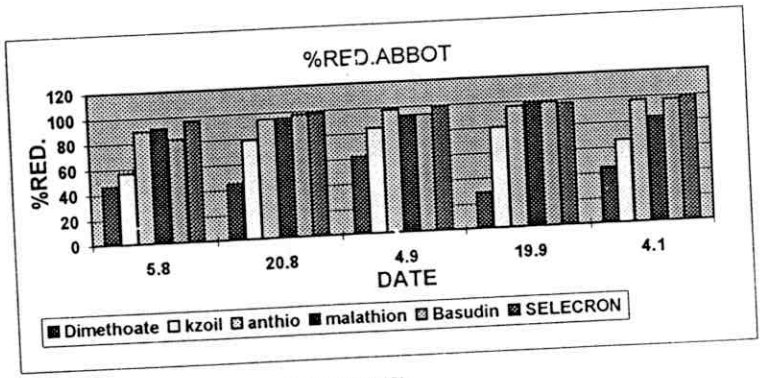
As for the ovipositing females, data in Table (13) indicate that spraying of Anthio or Malathion caused 100% reduction after 15 days of treatment. At the same time, Dimethoate, Kz oil, Basudin and Selecron led to 67.9, 76.8, 87.5 and 98.2% reductions in the ovipositing female counts, respectively. Lowest efficacious were recorded from Dimethoate application (47.2-69.2%), followed by KZ oil (57.4-82.6). Selecron may be, Fairly considered as the insecticide of highest efficacy on ***P. blanchardii*** ovipositing females as its use led to more than 95% reductions in the

recorded counts throughout the whole period (75 days) of inspection after treatment. The lowest reduction in ovipositing females number (47.22%) was produced at 30 days in case of Dimethoate (Table.13).

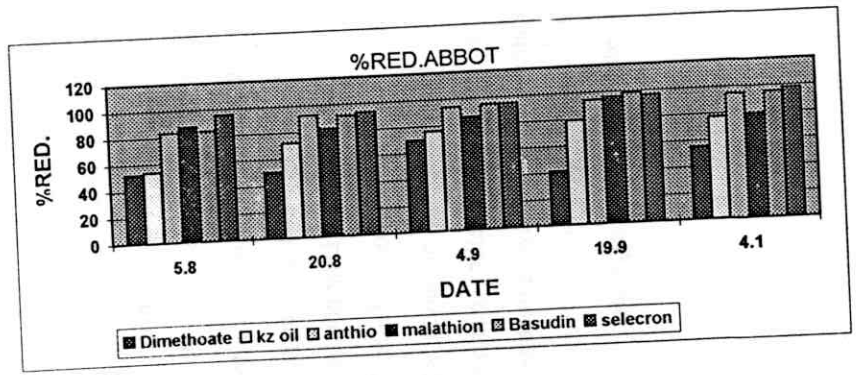
Concerning the numbers of total alive stages (N1+N2+adults) of ***P. blanchardii***; these numbers were reduced by 37.9-66.1, 60.5-82.2, 89-96.4, 79.4-97.1, 84.2-98.5 and 95.9-98% after treatment of Valenchia orange trees by Dimethoate, KZ oil, Anthio, Malathion, Basudin and Selecron, respectively (Table.13 and Fig.13). It could be deduced from Table.(13) that Dimethoate was the least effective insecticide on ***P. blanchardii*** as it led to the lowest mortality percentages among the alive stages of this pest (37.9-66.1%), followed by KZ oil which caused only 60.5% reduction after 15 days of treatment. On the contrary, Selecron was clearly, the most effective as it caused 96.5% reduction in total alive stage counts after 15 days of treatment and more than 95% reduction among individuals counted after 30-75 days from treatment. Anthio was also effective, leading to 89% reduction at 15 days after treatment and more than 93% reduction after that and up to 75 days (Table.13 and Fig.13).Malathion gave, relatively, good control measures, showing 91.8% reduction in total alive stage counts after 15 days of treatment.90.2, 90.3 and 97.1% reductions after more 15,30 and 45 days, while the last sample (75 days after treatment) showed 79.4% reduction in ***P. blanchardii*** the total alive stage count (Table.13&Fig.13d).

Table(13): Reduction percentages of ***Parlatoria blanchardi*** individual ccounts due to insecticidal application on July, 21st.1996 (fourth experiment)

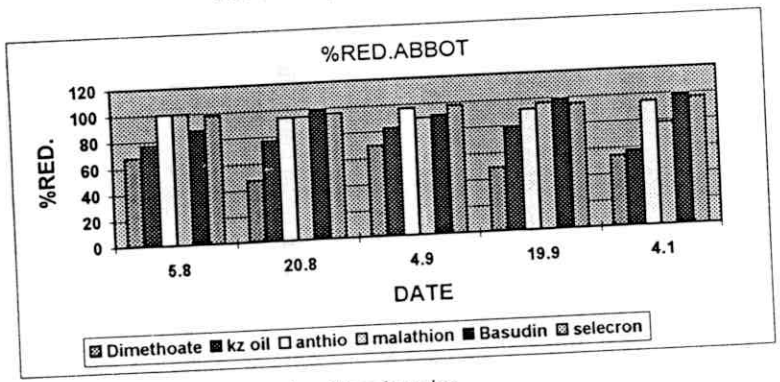
Inspection date				5.8	20.8	4.9	19.9	4.10.1996
			Pre spray count / 40 branches					
				Reduction percentages after (...days)				
Dyes after treatment				15	30	45	60	75
a:Preadult (N1+N2)								
Dimethoate	EC400	100ml/HL	332	46.18	44.55	61.46	28.76	44.11
kz oil	95%	1.5L	189	56.22	78.81	83.83	80.13	65.67
anthio	EC330	150ml	183	89.16	94.65	97.75	96.12	96.81
Malathion	EC570	300ml	430	91.57	95.05	93.11	98.38	83.23
Basudin	EC600	150ml	336	81.93	97.43	93.11	98.55	97.01
Selecron	EC720	75ml	468	96.39	98.22	98.45	96.77	99.00
b:Adult females								
Dimethoate			187	52.45	50.35	69.93	41.15	55.09
kz oil			137	53.50	71.93	76.13	79.13	77.21
anthio			119	83.22	92.34	93.56	94.04	94.25
Malathion			237	87.76	82.13	85.92	95.83	78.54
Basudin			143	83.57	91.18	94.99	98.21	95.13
Selecron			121	95.45	93.04	94.99	96.42	97.79
c:Ovipositing females								
Dimethoate			79	67.86	47.22	69.23	48.68	53.69
kz oil			53	76.79	76.98	82.59	78.62	57.38
anthio			29	100.00	94.05	96.76	92.11	94.67
Malathion			125	100.00	94.05	89.47	96.38	77.87
Basudin			118	87.50	98.81	91.09	98.36	98.77
Selecron			122	98.21	95.63	97.57	95.07	96.31
d:Total alive stages								
Dimethoate			645	52.87	47.78	66.07	37.86	50.55
kz oil			410	60.53	76.03	82.17	79.13	65.96
anthio			349	88.95	93.82	96.41	94.55	95.46
Malathion			859	91.75	90.20	90.32	97.11	79.42
Basudin			622	84.24	95.22	93.64	98.49	96.87
Selecron			733	96.47	95.88	97.37	96.46	98.04



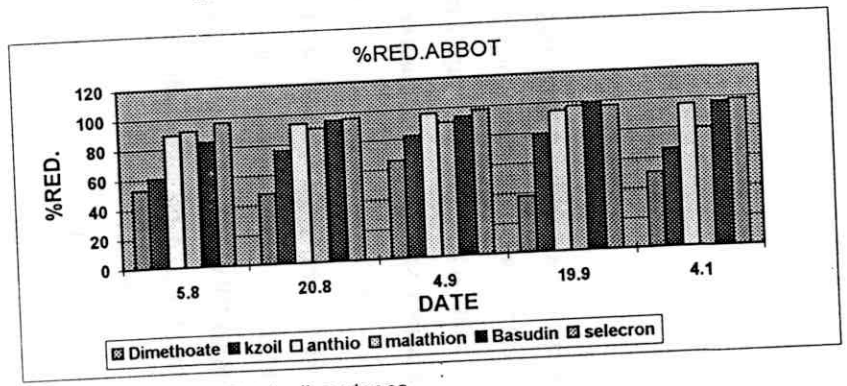
a:Preadult (N1+N2)



b: Adult females



c: Ovipositing females



d:Total alive stages

Fig. (13) Reduction percentages of ***Parlatoria blanchardii*** individual counts due to insecticidal application on July, 21 st. 1996 (fourth experiment)

IV.3.Efficacy of the insecticides against California red scale insect, *Aonidiella aurantii* (Mask.)

IV.3.aThe first experiment (one insecticidal application on March, 1995):

The reduction percentages in ***Aonidiella aurantii*** total number of preadult stages, adult females and total alive stages infesting 40 leaves and predatory mites, (***Amblyseius enab & Tydeius californicus***) after treatment by Actellic, Buprofezin and Diazinon are presented in Table (14) and Fig. (14) . Spraying took place on March, 13th 1995. After 105 days of spraying, the three treatments showed more than 95% reductions in the counted numbers of preadults stage (N1+N2) and also those of adult females. While, at 15 days after treatment, the reduction percentages in total counts of nymphes were75, 50 and 37.5% fore Actellic, Buprofezin and Diazinon treatments, respectively. These percentages were decreased to 10.7 in case of Actellic but increased to 46.43, 42.9% for Buprofezin & Diazinon after 30 days of treatment. Up to 90 days after treatment, the three insecticides caused 78.6-96.4, 76.9-79.5 and 41-90.6%, respectively (Table,14 and Fig.14).

Fifteen days after Actellic, Buprofezin and Diazinon applications, the total counts of ***A. aurantii*** adult females were found to be reduced by 68.4, 31.6 and 26.3%, respectively. Fifteen days later, these percentages decreased to5.9 & 11.8% in the two former insecticides and increased to 58.8% in the latter one. After 60-90 days from treatments, the reduction percentages were 84.6-93.8, 81.3-87.4 and 75.4-84.4% for Actellic, Buprofezin and Diazinon treatment, respectively (Table,14). The lowest rate of reduction (11.8%) was produced after 30 days of Buprofezin treatment.

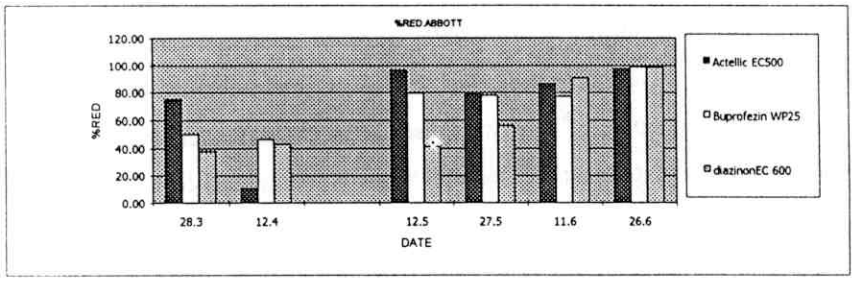
The percentage reduction of ***A. aurantii*** total alive stages reached above 95% after 60 days of Actellic treatment and after 105 days of the three insecticides application. After 15 days of treatment, Actellic was the most effective (55% reduction in total counts), followed by Diazinon (25%), while Buprofezin was the least effective (15% reduction). Fifteen days later,

reduced to only 2.2%. While, Buprofezin caused 17.4% reduction after 30 days of treatment. At 60-90 days after treatment, the reduction percentages increased, greatly, to 81.3-95.7 and 76.5-84.4 for Actellic and Buprofezin treatments, while it was 53.5-79.4% for Diazinon treatment (Table,14).

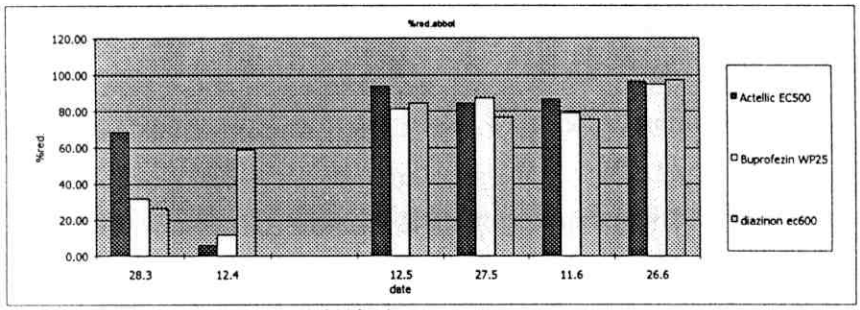
Actellic treatment produced above 90% population reduction of the predatory mites ***A. enab*** & ***T. californicus*** at 60&90 days and above 78% at 15&105 days. While mite counts increased by -204.2, -285.0% than the prespraying count at 30,75 days after treatment, respectively. Buprofezin treatment caused above 80% reduction in predacious mite counts at 60,90 and 105 days of treatment, and it caused 10.5% reduction after 15 days of treatment, while the predatory mite counts increased by −141.7,−755% after 30, 75 days of treatment, respectively. Diazinon caused 10.5% reduction after 15 days of treatment,81.3, 21.4 and 94.1% reductions after 60,90 and 105 days, respectively, while, the predatory mite counts increased by −179.2, −385% after 30, 75 days of Diazinon treatment (Table,14 & Fig.14).

Table(14): Redeuction percentages of *Aonidiella aurantii;* and predatory mites, *Amplyseius enab*& *Tydeius californicus* individual counts due to insecticidal application on March, 13th.1995 (First experiment)

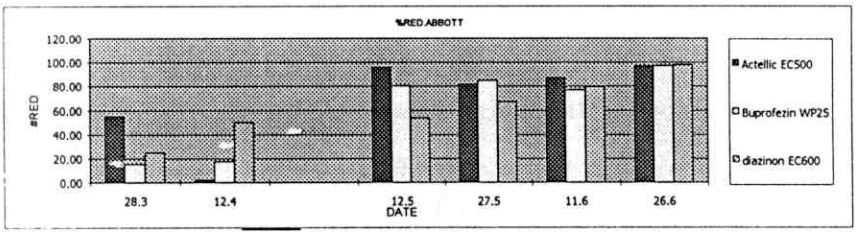
Inspection date		28.3	12.4	12..5	27.5	11.6	26.6.95
		pre spray count/40 leaves					
Days after treatment		15	30	60	75	90	105
				Reduction percentages after (...days)			
a: Preadult (N1+N2)							
Actellic EC500	9	75.00	10.71	96.39	78.57	86.32	97.02
Buprofezin WP25	7	50.00	46.43	79.52	77.68	76.92	98.72
DiazinonEC 600	12	37.50	42.86	40.96	56.25	90.60	98.30
b:Adult females							
Actellic EC500	22	68.42	5.88	93.75	84.57	86.86	96.89
Buprofezin WP25	12	31.58	11.76	81.25	87.43	78.86	95.03
Diazinon EC600	36	26.32	58.82	84.38	76.57	75.43	97.52
c:Total alive stages							
Actellic EC500	31	55.00	2.17	95.69	81.27	86.60	96.88
Buprofezin WP25	19	15.00	17.39	80.17	84.44	76.47	97.12
Diazinon EC600	48	25.00	50.00	53.45	66.67	79.41	97.84
d:*A. enab* and *T.californicus*							
Actellic EC500	32	78.95	-204.17	93.75	-285.00	92.86	88.24
Buprofezin WP25	17	10.53	-141.67	84.38	-755.00	89.29	88.24
DiazinonEC600	59	10.53	-179.17	81.25	-385.00	21.43	94.12



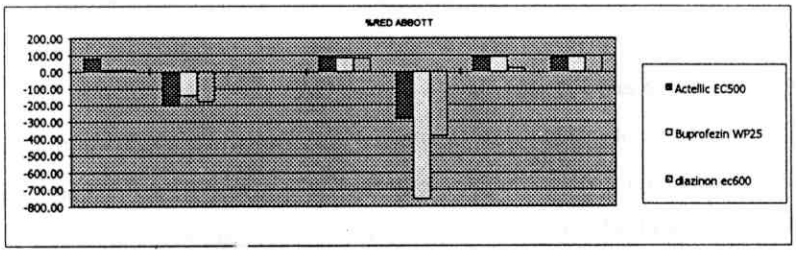
a: Preadult (N1+N2)



b. Adult females



c:Total alive stages



d: ***A. enab*** and ***T. californicus***

FIG. (14) Reduction percentages of ***Aonidiella aurantii;*** and predatory mite,***Amblyseius enab*** & ***Tydeius caalifornicus*** individuals counts due to insecticidal application on March,13th, 1995 (First experiment)

IV.3.b.The second experiment (one insecticidal application on April,1995):

The reduction percentages in ***Aonidiella aurantii*** total numbers of preadult stages, adult females and alive stages infesting 40 leaves after treatment by Diazinon, Buprofezin and Actellic on April.13th 1995 are presented in Table (15) and Fig. (15). The percentage reduction of total number of preadult stage (N1+N2) reached 100% after 45 and 60 days of treatment by Diazinon and it produced over 95% reductions at 15,30 and 75 days after treatment. After 90 &105 days of Diazinon treatment, these percentages decreased to 85.7& 62.5%. Buprofezin caused heights reduction (91%) after 75 days of treatment, while the remaining samples collected after showed varied reduction percentages ranged from 0 at 105 days to 74.6 at 90 days after treatment. Actellic caused considerable reductions in nymphes population after 15 and 30 days of Actellic application (96.9 and 95.6%, respectively; Table, 15). Heights reduction in nymphal count reduced 97.8% after 60 days of Actellic treatment, while the lowest reduction (50%) occurred 105 days of spraying this insecticide (Table,15).

The reduction percentage in adult female counts was 100% after 30 and 45 days of treatment by Diazinon , while the reduction percentages were, relatively, high among inspections after 15,60,75 and 90 days of treatment, being 98.5, 95.2,96 and 93.2%, respectively (Table,15 and Fig.15). Buprofezin was the least effective insecticide, as it caused a minimum of 49.2% reduction at 15 days, and a maximum of 84.3% reduction after 60 days of treatment. Actellic took intermediate position in efficacy on *A. aurantii*, as it caused 87.7 and 91.1 reduction after 15,30 days of treatment, and the reduction percentages in adult female counts reached a maximum of 94.6% at 60 days after treatment, while, the minimum % reduction due to Actellic treatment was 54.2% after 105 days of treatment (Table,15 and Fig. 15).

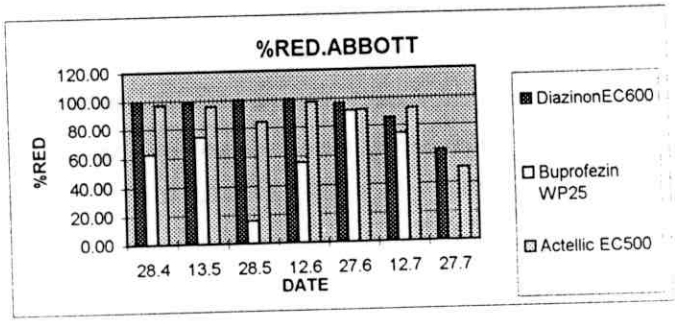
As for the effect of insecticidal treatments (on April.13th 1995) on total alive stages population, Diazinon showed highest efficacy, as it caused 99.4, 99.3, and 100% reductions after 15,30 and 45 days from treatment, and more than 96% reductions at 60 and 75 days.

Actellic came the next in its efficacy as this treatment cause more than 95% reduction in adult female counts after 15&30 days of treatment, and more than 91% reduction at 60 and 75 days after treatment (Table,15). While Buprofezin appeared as the least effective on *A. aurantii* adult female, causing 59.9%

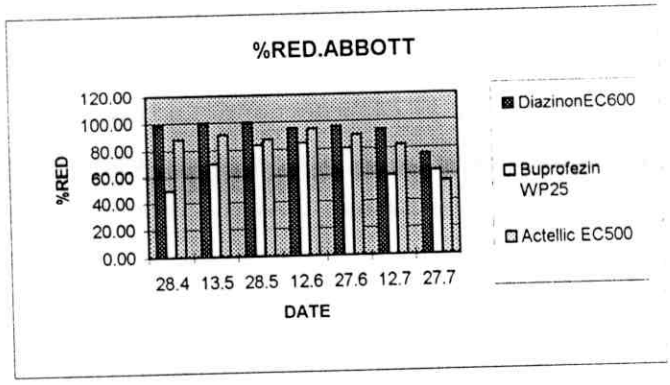
reduction at 15 days, 65.5-88.7 during the period from 30-90 days after treatment. and only 37.5%reduction in adult female counts at 105 days after treatment (Table.15 and Fig.15).

Table (15): Reduction percentages of *Aonidiella aurantii* individuals due to insecticidal application on April,13th.1995 (second experiment)

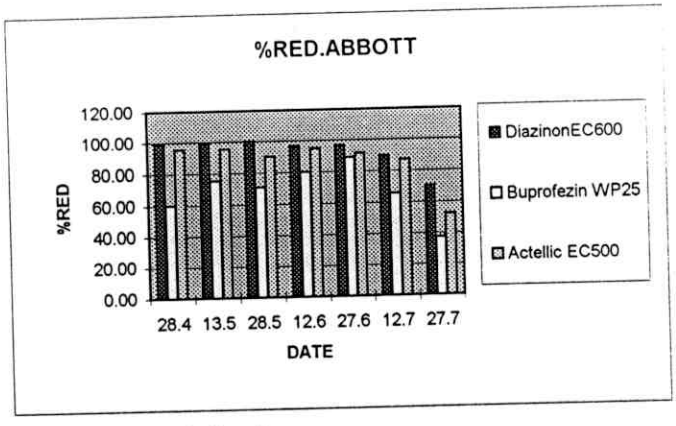
Inspection date		28.4	13.5	28.5	12.6	27.6	12.7	27.7.95
	Pre spray count/40 leaves							
		Reduction percentages after (...days)						
Days after treatment		15	30	45	60	75	90	105
a:Preadult (N1+N2)								
DiazinonEC600	95	99.62	99.12	100	100	96.64	85.71	62.5
Buprofezin WP25	21	62.59	74.12	15.87	55.55	91.04	74.6	0
Actellic EC500	6	96.94	95.61	84.126	97.77	91.41	92.06	50
b: Adult females								
DiazinonEC600	62	98.46	100	100	95.18	96	93.18	75
Buprofezin WP25	113	49.23	69.64	83.01	84.33	80	59.09	62.5
Actellic EC500	33	87.69	91.07	86.92	94.57	89.33	81.81	54.16
c:Total alive stages								
DiazinonEC600	157	99.38	99.34	100	96.63	96.52	89.38	70
Buprofezin WP25	134	59.93	75.24	70.55	79.83	88.69	65.48	37.5
Actellic EC500	39	95.1	95.11	89.96	94.95	91.01	86.72	52.5



a:Preadult (N1+N2)



b:Adult females



c:Total alive stages

FIG (15):Reduction percentages of ***Aonidiella aurantii*** individuals due to insecticidal application on April,13th.1995

IV.3.c.The third experiment (one insecticidal application on April,1996):

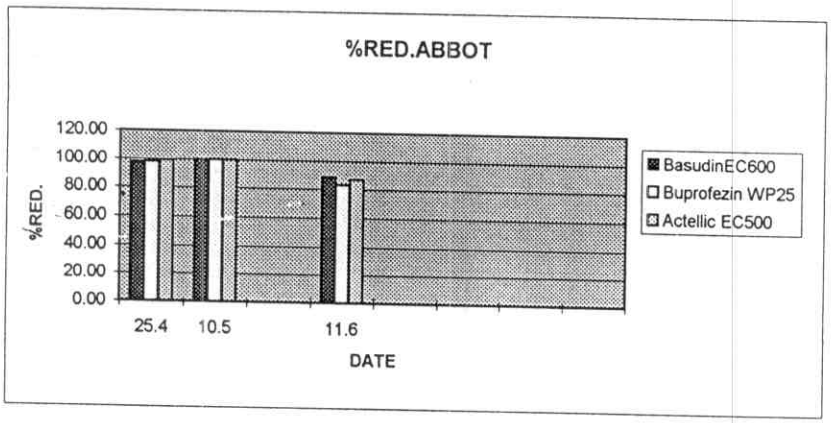
The reduction percentages of ***Aonidiella aurantii*** total numbers of preadult stage (N1+N2), adult females and total alive stages infesting 40 leaves, and predatory mites, (***Amblyseius enabe*** & ***Tydeius californicus***) after treatment by Basudin (Diazinon), Buprofezin, Actellic on April,10th 1996 are presented in Table (16) and Fig. (16). After 15 days of treatment, the reduction percentages in the nymphal stage reached 97.7, 98.1 and 99.2%, respectively due to applications on Basudin (Diazinon), Buprofezin and Actellic, respectively. These percentages increased to 100% fifteen days later. While, at the end of experiment (60 days after spraying), the reduction % in ***A.aurantii*** preadult counts were 88.6,82.9 and 87%, respectively (Table,16).

After spraying of the treatment insecticides, reductions in adult female counts were also high, being 98.9, 95.4 and 99.2%, respectively at 15 days, and increased to 99.1% for the three insecticides at 30 days, while these percentages reached 88.4, 92.5 and 94.6% after 60 days of spraying by Basudin (Diazinon), Buprofezin and Actellic, respectively.

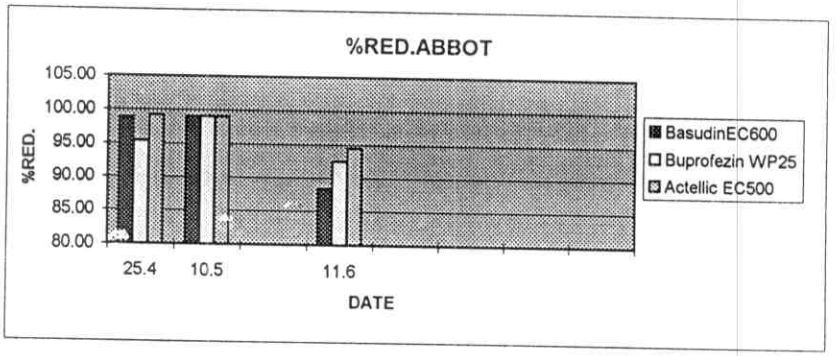
The total alive stage counts (N1+N2+adult females) were reduced by 98.2, 97.2 and 99.2 after 15 days of Basudin, Buprofezin and Actellic treatments, respectively, increased to 99.4% for the three insecticides at 30 days after treatment. While, after 60 days of insecticidal application, the reduction percentages in ***A. aurantii*** total alive stage counts reached 88.9% for Basudin (Diazinon) and Buprofezin treatments and 91.7% for Actellic treatment (Table,16 and Fig.16).

Table(16) Reduction percentages of ***Aonidiella aurantii;*** individual due to insecticidal application date April,10th. 1996 (third experiment)

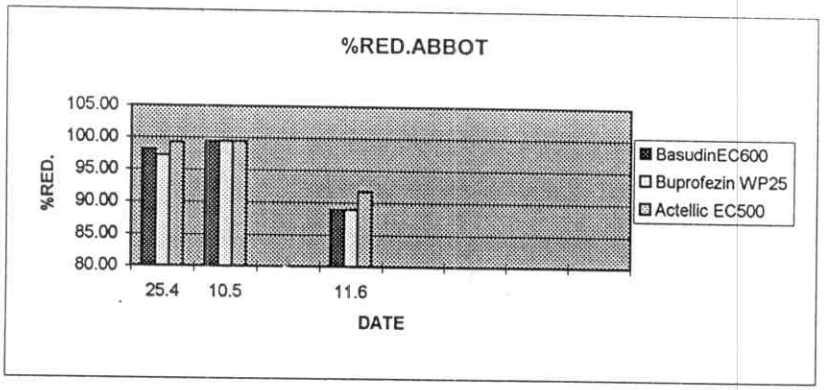
Inspection date		25.4	10.5	11.6.96
	pre spray count/40 leaves			
		Reduction percentages after (...days)		
Days after treatment		15	30	60
a:Preadult (N1+N2)				
BasudinEC600	72	97.65	100	88.62
Buprofezin WP25	10	98.08	100	82.93
Actellic EC500	46	99.14	100	86.99
b: Adult females				
BasudinEC600	29	98.85	99.05	88.44
Buprofezin WP25	13	95.4	99.05	92.52
Actellic EC500	11	99.23	99.05	94.56
c: Total alive stages				
BasudinEC600	101	**98.18**	**99.38**	**88.88**
Buprofezin WP25	23	97.15	99.38	88.88
Actellic EC500	57	99.22	99.38	91.67



a : Preadult(N1+N2)



b: Adult females



c:Total alive stages

FIG(16) Reduction percentages of ***Aonidiella aurantii;*** individual due to insecticidal application on April,10th. 1996 (third experiment)

IV.3.d.The fourth experiment (one insecticidal application on June,1996):

The reduction percentages of ***Aonidiella aurantii*** total number of preadult stages, adult females, alive stages infesting 40 leaves, and those of predatory mites (***Amblyseius enabe*** & ***Tydeius californicus***) after treatment by Basudin (Diazinon), Actellic and Buprofezin on June,30th 1996 are presented in Table (17)& Fig. (17). The reduction percentages in total number of preadult stage 98, 81.6 and 29.6% after 15 days of treatment by Basudin (Diazinon), Actellic and Buprofezin, respectively. Fifteen days later, these percentages of reduction became 98, 75.5 and 67.4%, respectively. While after 60 days from treatment, Basudin (Diazinon) led to complete disappearance of ***A. aurantii*** nymphs on the citrus leaves, while Actellic caused 98.6 and 95.7% reductions, and Buprofezin led to 93.2 and 84.8% reductions, respectively. The lowest reduction % (29.6%) was detected after 15 days of Buprofezin treatment (Table,17).

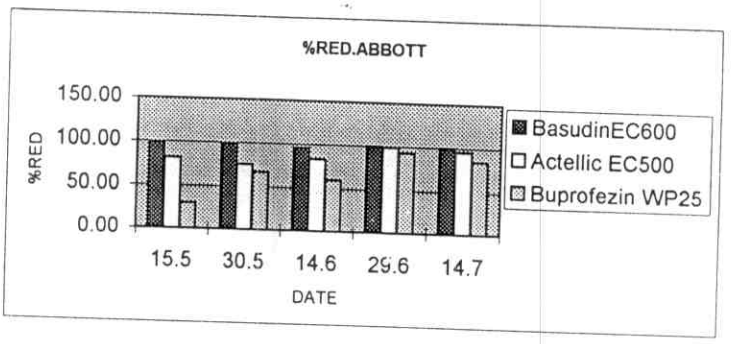
As for ***A.aurantii*** adult females, their numbers were found led to be reduced by 71.9, 31.3 and 46.9% after 15 days of treatment by Basudin (Diazinon), Actellic and Buprofezin, respectively. Basudin (Diazinon) was found as the most effective insecticide on adult females, as the reduction percentages among this stage increased to 100, 98.8 and 100% after 30,45 and 60 days of treatment, respectively, opposed to 79.1, 88.6 and 88.4 in case of Actellic and 72.1, 81.6 and 87.4 %, respectively in case of Buprofezin. While, at the end of experiment (75days after treatment), the reduction percentages in ***A.aurantii*** adult female counts reached 88.5, 73.8 and 82%, respectively.

Regarding the total alive stage (N1+N2+adult females) counts, those were reduced by 95, 75.9 and 31.6% after 15 days of Basudin (Diazinon), Actellic and Buprofezin, respectively. At 30 days after treatment, these percentages increased to 99.3, 83.2 and 76%, respectively, and became 98.4, 87 and 74.2%, respectively after more 15 days. Complete absence (100% reduction) of ***A.aurantii*** total alive stages occurred after 60 days of Basudin (Diazinon) treatment, opposed to 96.4 and 91% for Actellic and Buprofezin, respectively. While, 75 days after treatment the calculated percentages of reductions in total alive stage counts were 93.8, 81.3 and 83.9% for Basudin (Diazinon), Actellic and Buprofezin treatment, respectively (Table,17 and Fig. 17).

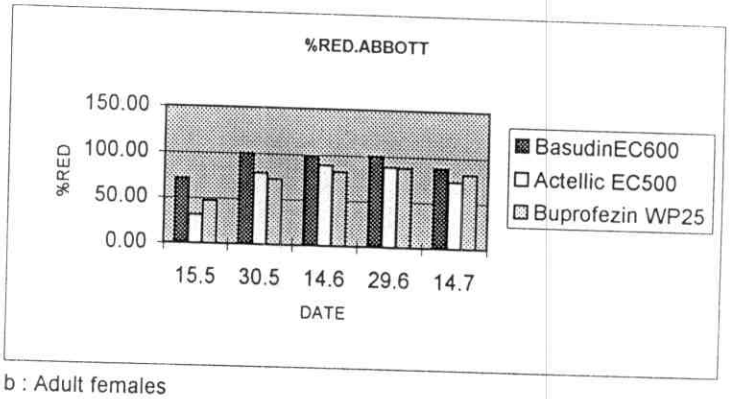
After 15 days of Basudin (Diazinon), Actellic and Buprofezin treatments, the total prespraying counts of the predatory mites (***A. enab and T. californicus***) were found to be reduced by 98.6, 97.9 and 88.3 %, respectively. After fifteen days later these mite species disappeared completely (100% reduction) on citrus leaves of Actellic and Buprofezin treatments, opposed to 13.8% reduction in case of Basudin treatment. Up to 75 days after treatment, the three insecticides caused 2.56-88.33, 3.90 and 41.0-92%, respectively (Table 17 & Fig. 17).

Table(17) : Reduction percentages of ***Aonidiella aurantii;*** and associated predatory mites, ***Amblyseius enab*** & ***Tydeius californicus*** individual due to insecticidal application on June, 30th.1996 (fourth experiment)

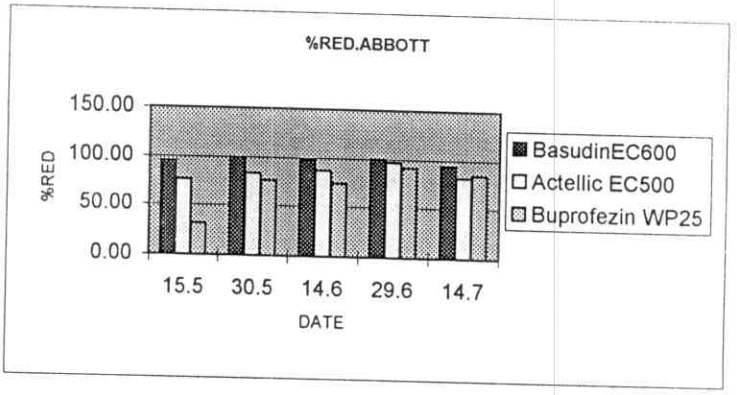
Inspection date		15.5	30.5	14.6	29.6	14.7.96
	Pre spray count/ 40 leaves					
		Reduction percentages after (...days)				
Days after treatment		15	30	45	60	75
a: Preadult (N1+N2)						
BasudinEC600	40	98.00	97.96	95.52	100.00	100.00
Actellic EC500	172	81.60	75.51	83.58	98.64	95.65
Buprofezin WP25	18	29.60	67.35	59.70	93.22	84.78
b: Adult females						
BasudinEC600	53	71.88	100.00	98.78	100.00	88.52
Actellic EC500	101	31.25	79.07	86.57	88.42	73.77
Buprofezin WP25	41	46.88	72.09	81.63	87.37	81.97
c:Total alive stages						
BasudinEC600	93	95.04	99.25	98.37	100.00	93.75
Actellic EC500	273	75.89	83.15	86.96	96.43	81.25
Buprofezin WP25	59	31.56	76.03	74.18	90.95	83.93
d*: A. enab and T. californicus*						
BasudinEC600	79	98.62	13.79	2.56	88.00	50.00
Actellic EC500	72	97.93	100.00	33.33	90.00	62.50
Buprofezin WP25	44	88.28	100.00	41.03	92.00	68.75



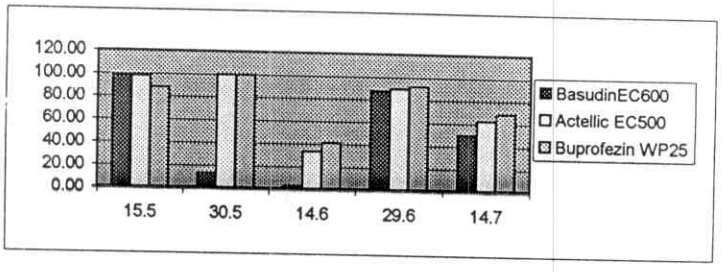
a: Preadult (N1+N2)



b : Adult females



c :Total alive stages



d : ***A. enab*** and ***T. californicus***

FIG. (17) Reduction percentages of ***Aonidiella aurantii;*** and associated predatory mites, individuals due ***Amblyseius enab*** & ***Tydeius californicus*** individual due to insecticidal application on June,30th.1996 (fourth experiment)

IV.4.Efficacy of the insecticides against citrus wax scale, *Ceroplastes floridensis* (Comestok):

IV.4.a.The first experiment (one insecticidal application on June, 1st ,1995):

For estimating the efficacy of Actellic, Buprofezin and Diazinon on *Ceroplastes floridensis* ., only one sample of 50 branches was collected replicate after 90 days of treatment of Navel trees. All the assayed insecticides resulted more than 98% mortality in *C. floridensis* total alive stages counts than those counted on branches of the untreated trees (Table,18 and FIG. 18) .

IV.4.b.The second experiment (one insecticidal application on May, 20th 1996):

The overall reduction percentages in the total alive stages counts of *C.floridensis* were 98.8, 98.6 and 98.6% due to spraying Actellic, Buprofezin and Diazinon on Navel orange trees, respectively (Table,19 and Fig.19).

Table (18) Reduction percentages of ***Ceroplastes floridensis;*** individual due to insecticidal application on Navel orange trees. (Application date, June,1st.1995).

Total number of alive stages / 50 branches / tree

Product	R1	R2	R3	total on 150 branch
Actellic EC500	2	3	2	7
Buprofezin WP25	5	3	15	23
Diazinon EC600	2	8	3	13
untreated	620	702	644	1966

	% Reduction			Overall
Actellic EC500	99.68	99.57	99.69	99.64
Buprofezin WP25	99.19	99.57	97.67	98.83
Diazinon EC600	99.68	98 86	99.53	99.34

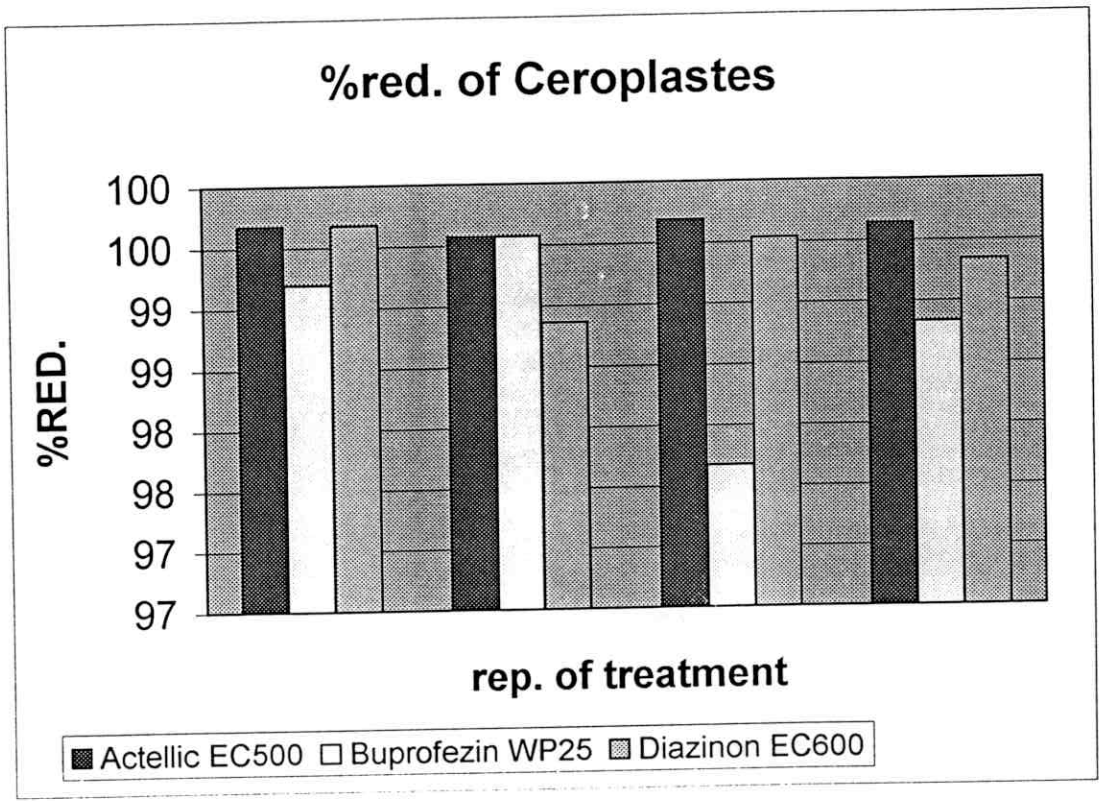


FIG (18) Reduction in percentage of ***Ceroplastes floridensis*** individuals due to insecticidal application.
on 150 branch\Treatment

Table(19) Reduction percentages in ***Ceroplastes floridensis*** individuals due to insecticidal application on Navel orange trees. (Application date, May,20th.1996).

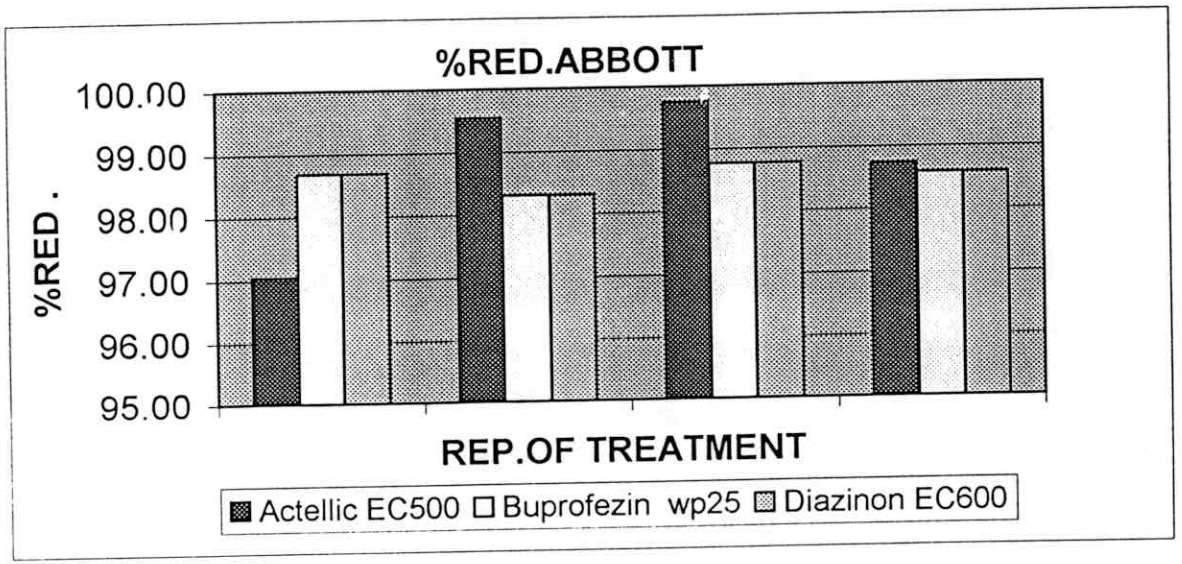
Total number of alive stages/50 branches/tree

Product		R1	R2	R3	total on 150 branch
Actellic	EC500	27	4	2	33
Buprofezin	WP25	25	7	3	35
Diazinon	EC600	12	15	10	37
Untreated		915	888	808	2611

% Reduction

					Overall
Actellic	EC500	97.05	99.55	99.75	98.74
Buprofezin	wp25	98.69	98.31	98.76	98.58
Diazinon	EC600	98.69	98.31	98.76	98.58

C.FLORIDENSIS .2



FIG(19) Reduction in percentage of ***Ceroplastes floridensis*** individuals due to insecticidal applicatio on 150 branch\Treatment

IV.5. FRUIT COUNT TRIAL (1996)

Two criteria were taken to estimate the effectiveness of the total scalicides (Diazinon, Buprofezin and Actellic) on the concerned scale insects; a- percentage of infested fruits, and b- total alive stages counts of scale insects on Navel orange fruits- As shown in Table (20) and Fig. (20), it is clear that after 130 days of spraying Diazinon, Buprofezin and Actellic led to overall reduction of 63.4, 53.7 and 56.7% in the infested fruit numbers and 87.4, 65.1 and 81.4% reductions in the numbers of total alive stages counts.

An examination of the results described above for the chemical control of *C. beckii, A. aurantii* and *P. blanchardii* and according to the general means of reduction percentages of stages and treatment it could be generally concluded the following :

a) All tested scalicides gave exellent results against the purple scale insect, *C. beckii.* California scale insect, *A. aurantii* and palm scale insect. *P. blanchardii* infesting orange trees at Qalubiyah Governorate and we can use Kz oil and Basudin at rate of 1.5 % and 150 hl/Hl, respectively as a summer spraying on citrus trees against scale insects without any side effect on the treated trees.

b) nymphs and adult females showed highly response to the tested scalicides then the adult female laying eggs or nymphs especially after a short time of treatment However, the probongation of time after treatment showed highly effects for all stages.

Although scalicides have been used against citrus pests, scale insects, mealy bugs, aphids and mites for more than 40 years no signs of resistance development against their toxic action has been recorded .

Results are similar at those obtained by **Helmy et. al**. (1982), and El-Imery (1985), found that adult females of the wax scale insect, *C. floridensis* was slightly tolerant to the tested scalicides than nymphal stages. . **Abdel-Megeed et. al** (1988),(1991) and **Yaron et. al.** (1988) studied the effectiveness of Bubrofezin against the citrus pests *Aonidiella aurantii* , **Eisa et. al**. (1991), studied the effects of

insect growth regulators (I.G.R.) at concentration of 5 and 50 p.p.m on *C. floridensis.*,and **Helmy et. al** (1991).

Table(20) Reduction percentages in ***Cornuaspis beckii*** , ***Parlatoria blanchardii*** and ***Aonidiella aurantii*** individuals due to insecticidal application on 50 Navel orange fruits on April,24th.1996

Counts after 130 days of treatments

Number of infested fruits

	R1	R2	R3	Mean
DiazinonEC600	15	21	13	16.3
Buprofezin WP25	15	28	19	20.6
Actellic EC500	21	22	15	19.3
Check	43	47	44	44.6

Counted scale insects individual

	R1	R2	R3	Mean
	83	57	28	56
	69	262	134	155
	89	88	70	82.3
	279	412	610	433.6

% Reduction

	R1	R2	R3	Overall
DiazinonEC600	65.12	55.32	70.45	63.43
Buprofezin WP25	65.12	40.43	56.82	53.73
Actellic EC500	51.16	53.19	65.91	56.72

% Reduction

	R1	R2	R3	Overall
	70.25	87.10	95.41	87.38
	75.27	40.72	78.03	65.06
	68.10	80.09	88.52	81.44

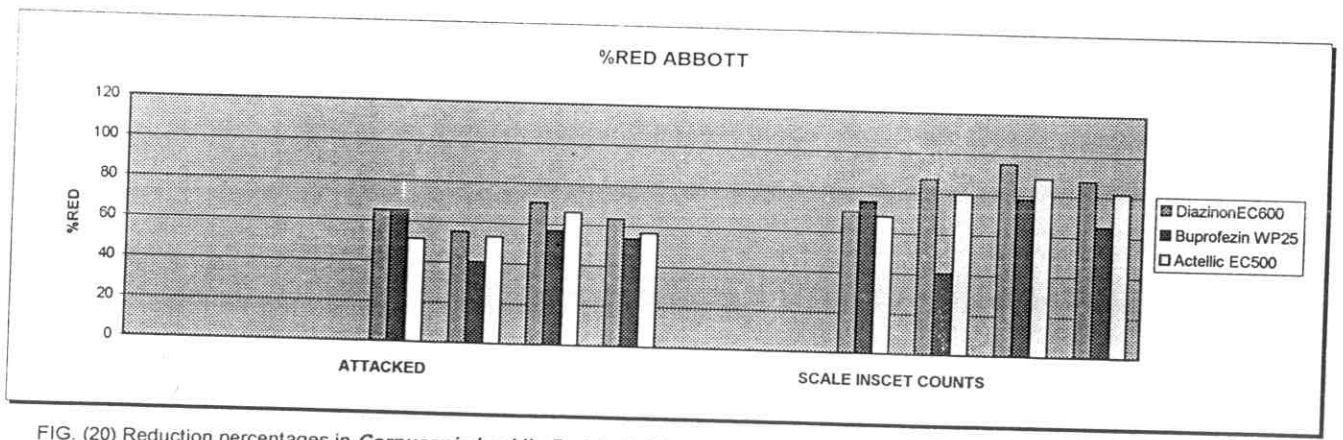


FIG. (20) Reduction percentages in ***Cornuaspis beckii*** , ***Parlatoria blanchardii*** and ***Aonidiella aurantii*** individuals due to insecticidal applications on 50 Navel orange fruits on April,24th.1996.