

**SEASONAL VARIATIONS IN DISPERSAL AND POPULATION
DENSITY OF THE GLASSY CLOVER SNAIL *Monacha cartusiana*
(MULLER) IN EGYPTIAN CLOVER FIELDS IN SHARKIA
GOVERNORATE**

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ABSTRACT: Dispersal of adults, juveniles and population density of egg clutches and eggs of the glassy clover snail *Monacha cartusiana* (Muller) were studied in Egyptian clover fields in Sharkia Governorate along the duration starting from October to June during two successive seasons 2007/2008 and 2008/2009. The goal of study to limit the suitable distances and times at which successful management can be applied against the different stages of glassy clover snail.

The results indicated that *M. cartusiana* adult snails reached the highest density at 5 and 10 meters adjacent to the irrigation canal in October, November and December 2007 and at 20 meters during March, April and May 2008, the lowest ones were detected in February 2008 while during the second season 2009, the highest density was observed in March and April and the lowest one was detected in January. Adults were never detected during June in both seasons.

Juveniles were firstly recorded in December 2007 and November 2008, then increased gradually during January, reached its peak values in January, February and March 2008 and 2009 at 5, 10 and 15 meters and disappeared in May. The mean counted numbers were less during (2008-2009) than (2007-2008).

Egg clutches and egg numbers reached the maximum numbers during November and December in both seasons especially at 5, 10 and 15 meters adjacent to the irrigation canal. Clutches and eggs decreased during January and February then disappeared in March of both seasons.

According to the obtained results, it could be suggest the suitable and successful management which can be applied against the different stages of the glassy clover snail, *Monacha cartusiana*.

INTRODUCTION

The stylommatophoran species including land snails and slugs, have gained an economical importance since they became among the pests attacking several crops in many parts of the world (Baker, 1988a & Baker and Vogelzang, 1988).The glassy clover snail (*Monacha cartusiana*) promotes substantial ecological and economic impacts in areas where it has been introduced. This snail is one of the most destructive pests affecting the majority of economic field crops especially Egyptian clover (Mahrous *et al.*, 2002a and Shetaia, 2005). The control of these pests either chemically or biologically requires an understanding their biological, physiological and ecological activities (Heiba *et al.*, 2002).

Dispersal of terrestrial gastropods from aestivation sites to the adjacent crops was reported by many investigators (Baker, 1988, a,b; Baker & Vogelzang, 1988; Staikou & Lazaridou - Dimitriadou, 1990; Ali and Suleman, 1992; Ghamry *et al.*, 1993b; Nakhla *et al.*, 2002; Shetaia, 2005 and Arafa, 2006). Also, egg clutches and egg number of *M. cartusiana* were determined in the field of Egyptian clover by many authors (Ismail,1997; Mahrous *et al.*, 2002b, Mortada, 2002 and Mahrous *et al.*, 2006).

The present work aims to throw light on the dispersal of adults, juveniles, the population density of clutches and eggs of the glassy clover snail, *Monacha cartusiana* infesting Egyptian clover (*Trifolium alexandrinum*) during two successive seasons 2007/ 2008 and 2008/ 2009 to detect the suitable distances and times at which control procedures can be applied successfully.

MATERIALS AND METHODS

Dispersal of adults and juveniles and population density of clutches and eggs of the glassy clover snail *M. cartusiana* were studied during two successive growing seasons 2007/2008 and 2008/2009 in Egyptian clover fields located in El-Nakhas village, Sharkia Governorate. Within this area, about one feddan of Egyptian clover was defined as the experimental site, characterized by its clay soil, rice was the previous crop and presence

bunches of elephant grasses growing on the inner belt of the irrigation canal. Sampling was carried out during the activity period of the snail in early morning before sunshine by using quadrat sample size of 50 x 50 cm (Staikou *et al.*, 1990). Five replicates (quadrates) for each stage (adults, juveniles and eggs) were randomly examined biweekly at the indicated distances, 5, 10, 15 and 20 meters starting from the irrigation canal towards the field. All adult and juvenile snails found on plants or on soil surface in the quadrat were counted and left in their initial sites. Number of clutches and number of eggs in each clutch were counted and carefully returned back to their initial sites,

Statistical analysis:

Data were statistically analyzed according to the method of CoHort Software (2004) Costat.WWW. CoHort. Com. Monterey, California, U.S.A. and the least significant differences were calculated at 0.05 level.

RESULTS AND DISCUSSION

Data in Table (1) illustrated that the mean number of counted *M. cartusiana* adult snails during season (2007-2008) reached the highest values (177.4, 11.8 and 5.4) in October, November and December, respectively at 5 meter adjacent to the irrigation canal, then decreased gradually in January and February with average number 1.2 and 0.2, respectively. The population increased in March with the mean number, 4 and decreased in April and May with mean number 0.6 and 0.8 consequently. Considering distances, general mean of counted adults found that the highest counted numbers were detected at 5 meters then decreased with increasing distance towards the field (22.38, 1.64, 1.27 and 1.42) at 5, 10, 15 and 20 meter respectively. During (2008-2009), the highest counted numbers were detected in February, March and April with mean numbers, 5.2, 5.8 and 5.6, respectively at 5 meter. Considering the distance, the counted numbers decreased with increasing distance towards the field nearly at all time intervals with general mean 2.69, 1.27, 1.6 and 0.91 at 5, 10, 15 and 20 meter, respectively.

Table (1): The mean numbers of *Monacha cartusiana* adult snails counted in 50 x 50 cm in Egyptian clover field at different distances adjacent to the irrigation canal during two successive seasons.

Date	October 2007 to June 2008				F.test	L.S.D 0.05%	October 2008 to June 2009				F.test	L.S.D 0.05%
	Distance (meters)						Distance (meters)					
	5	10	15	20			5	10	15	20		
Oct.	177.4	1.8	0.8	0.6	*	121.68	1.2	0	0	0	***	0.29
Nov.	11.8	5.8	3.4	2	*	5.83	1.6	0.8	0.4	0.2	*	0.82
Dec.	5.4	1.8	1.2	1	**	2.39	3.4	1.6	0.6	0.4	*	2.61
Jan.	1.2	0.6	0.4	0.4	N.S	1.18	0.2	0.6	0.8	0.2	N.S	1.14
Feb.	0.2	0.2	0	0	N.S	0.42	5.2	0.8	3.8	0.4	N.S	4.87
Mar.	4	3.6	2.8	3	N.S	7.66	5.8	3.8	3.4	2.8	*	2.99
Apr.	0.6	0.2	1.2	4	***	1.24	5.6	3.6	5	4.2	N.S	3.8
May	0.8	0.8	1.6	1.8	N.S	1.24	1.2	0.2	0.4	0	N.S	1.6
June	0	0	0	0			0	0	0	0		
General Mean	22.38	1.64	1.27	1.42	N.S	31.59	2.69	1.27	1.6	0.91	N.S	1.89

There is significant difference between the mean numbers at 5 meters in comparison with that at 10, 15 and 20 meters during October, November and December 2007. This difference was insignificant during January, February, March and May 2008 but was significantly decreased at 5, 10 and 15 meters in comparison with that found at 20 meters during April. During the season 2007/ 2008 the average numbers was differed according to distance of irrigation canal, whereas, the difference is insignificant between the general mean numbers 22.38, 1.64, 1.27 and 1.42 individuals at 5, 10, 15 and 20 meters. Season 2008/ 2009 showed that there is highly significant difference between the counted numbers of adults during October at 5 meters adjacent to the irrigation canal compared with those at 10, 15 and 20 meters. This difference is significant at 5 meters in November and December compared with those at 15 and 20 meters. In March, there is significant difference between the mean numbers at 5 meters in comparison with that at 20 meters. The difference is insignificant between the general mean values (2.69, 1.27, 1.6 and 0.91) of the counted numbers at the different distances.

Table (2): The mean numbers of *Monacha cartusiana* juveniles counted in 50 x 50 cm in Egyptian clover field at different distances adjacent to the irrigation canal during two successive seasons.

Date	October 2007 to June 2008				F. test	L.S.D 0.05%	October 2008 to June 2009				F.test	L.S.D 0.05%
	Distance (meters)						Distance (meters)					
	5	10	15	20			5	10	15	20		
Oct.	0	0	0	0			0	0	0	0		
Nov.	0	0	0	0			1	0	0	0	*	0.82
Dec.	0	1	0	0	N.S	1.16	8.4	2.6	2.2	0.2	*	5.43
Jan.	18	33.4	26.4	5.6	N.S	26.87	19.2	15.4	4.6	1.4	*	12.24.
Feb.	63.6	76	39	14.6	*	43.23	17.6	22.6	24.2	3.4	*	14.35
Mar.	46.4	47.8	41.6	30.6	N.S	31.69	7.2	5.6	4	3.4	N.S	3.93
Apr.	0	0	0.6	1	N.S	1.31	5.8	2.2	2.4	4.8	N.S	5.84
May	0	0	0	0			0	0	0	0		
June	0	0	0	0			0	0	0	0		
General Mean	14.22	17.58	11.96	5.76	N.S	22.79	6.58	5.38	4.16	1.47	N.S	6.94

Table (2) indicated that juveniles of *M. cartusiana* were not detected during October and November 2007 but firstly observed in December, gradually increased during January and reached the maximum numbers in February and March 2008 with mean number, 63.6, 76, 39 and 14.6 at 5, 10, 15 and 20 meters, respectively in February while, during March the average numbers were, 46.4, 47.8, 41.6 and 30.6 in. Juveniles decreased in April and disappeared in May. Considering distances, general mean of counted juveniles found that the highest counted numbers were detected at 5 and 10 meters then decreased with increasing distance towards the field (14.22, 17.58, 11.96 and 5.76) at 5, 10, 15 and 20 meter, respectively. Statistical analysis showed that the difference between the averages of the counted juveniles at the different distances was insignificant during December 2007 and (March & April 2008) but was significant between values at 10 and 20 meter in January 2008. In February, the difference was significant at 5 and 10 meter in comparing with that obtained at 20 meter. At the end of season 2007/ 2008, there is insignificant difference between the general means (14.22, 17.58, 11.96 and 5.76) at the different distances. During The season 2008/ 2009, immatures revealed the same trend in season 2007/ 2008 but were detected earlier during November. The highest numbers were detected at 5 meter adjacent to the irrigation canal then decreased with increasing

distance towards the field with general means, 6.58, 5.38, 4.16 and 1.47 at 5, 10, 15 and 20 meter, respectively. The difference between the mean numbers of juveniles at 5 meters is significant comparing with that found at 10, 15 and 20 meter during November and December. In January, the difference is significant at 5 and 10 meter comparing with that recorded at 15 and 20 meter. This difference is also significant in February at 5 and 10 meter comparing with that at 20 meter. There is insignificant difference in March, April and at the end of season 2007/2008 between the mean values (6.58, 5.38, 4.16 and 1.47).

Table (3): The mean values of *Monacha cartusiana* egg clutches counted in 50 x 50 cm in Egyptian clover field at different distances adjacent to the irrigation canal during two successive seasons.

Date	October 2007 to June 2008				F.test	L.S.D 0.05%	October 2008 to June 2009				F.test	L.S.D 0.05%
	Distance (meters)						Distance (meters)					
	5	10	15	20			5	10	15	20		
Oct.	0	0	0	0			0.4	0	0	0	N.S	0.59
Nov.	3.2	4.8	1.6	4.2	N.S	9.51	4	0.4	0.2	0	N.S	4.21
Dec.	4.8	4.2	2.2	1.2	N.S	7.43	2.2	1.2	1	1	N.S	2.11
Jan.	0.6	0.8	1.2	0.6	N.S	7.33	0.2	0.2	0.4	0.2	N.S	0.73
Feb.	0.4	0.2	0.2	0	N.S	0.56	0.2	0	0	0	N.S	0.29
Mar.	0	0	0	0			0	0	0	0		
Apr.	0	0	0	0			0	0	0	0		
May	0	0	0	0			0	0	0	0		
June	0	0	0	0			0	0	0	0		
General Mean	1	1.11	0.58	0.67	N.S	4.14	0.78	0.20	0.18	0.13	N.S	0.82

Table (3) revealed that egg clutches were firstly detected during November 2007. The number increased to reach the highest mean value (4.8) in November and December then decreased gradually in January and February 2008. Egg clutches were not detected in March. The same trend was nearly observed during season 2008/ 2009 but the egg clutches were firstly detected in October and the maximum mean value was 4 clutches in November. Considering distances, general mean of counted egg clutches found that the highest values were detected at 5 and 10 meter then decreased with increasing distance towards the field (1, 1.11, 0.58 and 0.67) in 2007/

2008 and (0.78, 0.20, 0.18 and 0.13) in 2008/ 2009 at 5, 10, 15 and 20 meter, respectively. In both seasons, the differences between means of the counted egg clutches were insignificant. It could be concluded that the majority of egg clutches were recorded in November and December as compared to lower values in January and February.

Table (4): The mean values of *Monacha cartusiana* egg numbers counted in 50 x 50 cm in Egyptian clover field at different distances adjacent to the irrigation canal during two successive seasons.

Date	October 2007 to June 2008				F.test	L.S.D 0.05%	October 2008 to June 2009				F.test	L.S.D 0.05%
	Distance (meters)						Distance (meters)					
	5	10	15	20			5	10	15	20		
Oct.	0	0	0	0			2	0	0	0		
Nov.	33.8	135.8	57.8	23	N.S	150.16	35.8	6.6	2.4	0	*	2.99
Dec.	122.2	89.2	57.6	11.6	*	93.33	35.4	26.6	18	9.6	**	20.19
Jan.	9.6	19.6	13.6	10.6	N.S	28.79	4	3.2	5.8	0.8	N.S	29.59
Feb.	1.6	4.4	3	0	N.S	7.98	0.4	0	0	0	N.S	10.001
Mar.	0	0	0	0			0	0	0	0	N.S	0.59
Apr.	0	0	0	0			0	0	0	0		
May	0	0	0	0			0	0	0	0		
June	0	0	0	0			0	0	0	0		
General Mean	18.58	27.67	14.67	5.02	36.09	N.S	8.62	4.04	2.91	1.16	10.2	N.S

Data in Table (4) showed that *M. cartusiana* laid its eggs during three months started from November to February. Eggs were rarely detected before or after this period. The number of eggs were changed during the breeding season according to distance far from the irrigation canal and the time of sampling. The highest counted numbers of eggs were detected during November and December then decreased gradually in January and February. Considering distances, general means of counted eggs found that the highest values were detected at 5 and 10 meter then decreased with increasing distance towards the field (18.58, 27.67, 14.67 and 5.02) in 2007/ 2008 and (8.62, 4.04, 2.91 and 1.16) in 2008/ 2009 at 5, 10, 15 and 20 meter, respectively. During the season (2008-2009), eggs were counted with less numbers. There is insignificant difference between means of the counted eggs at the different distances during months of the two successive seasons except November 2008 and December of both seasons. Insignificant

difference was observed between general means of the counted numbers at the end of examination.

Table (5): The total values of means of the population density of adults, juveniles, egg clutches and eggs of *Monacha cartusiana* counted in 50 x 50 cm at the studied distances along two successive seasons.

Distance (m.)	Total values of population							
	Adults		Juveniles		Egg clutches		Eggs	
	2007/2008	2008/2009	2007/2008	2008/2009	2007/2008	2008/2009	2007/2008	2008/2009
5	201.4	24.2	128	59.2	9	7	167.2	77.6
10	14.8	11.4	158.2	48.4	10	1.8	249	36.4
15	11.4	14.4	107.6	37.4	5.2	1.6	132	26.2
20	12.8	8.2	51.8	13.2	6	1.2	45.2	10.4
Total	240.4	58.2	445.6	158.2	30.2	11.6	593.4	150.6

Table (5 & 6) showed that the mean values of the counted numbers of *M. cartusiana*, adults, juveniles, egg clutches and eggs were generally higher during 2007/2008 than those counted during 2008/2009 where the total numbers were, 240.4 and 58.2 matures; 445.6 and 158.2 immatures; 30.2 and 11.6 egg clutches and 593.4 and 150.6 eggs in 2007/ 2008 and 2008/2009, respectively.

Table (6): The average numbers of the population density of adults, juveniles, egg clutches and eggs of *Monacha cartusiana* counted in 50 x 50 cm during two successive seasons (2007 – 2008) and (2008 – 2009).

Month	Total values of population							
	Adults		Juveniles		Egg clutches		Eggs	
	2007/2008	2008/2009	2007/2008	2008/2009	2007/2008	2008/2009	2007/2008	2008/2009
Oct.	180.6	1.2	0	0	0	0.4	0	2
Nov.	23	3	0	1	13.8	4.6	250.4	44.8
Dec.	9.4	6	1	13.4	12.4	5.4	280.6	89.6
Jan.	2.6	1.8	83.4	40.6	3.2	1	53.4	13.8
Feb.	0.4	10.2	193.2	67.8	0.8	0.2	9	0.4
Mar.	13.4	15.8	166.4	20.2	0	0	0	0
Apr.	6	18.4	1.6	15.2	0	0	0	0
May	5	1.8	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0
Total	240.4	58.2	445.6	158.2	30.2	11.6	593.4	150.6

In conclusion, our results documented that numbers of *M. cartusiana* adults was clearly increased during spring months as compared to low and moderate values during winter and autumn months. Results are in agreement to certain extent with the findings of many authors, who studied dispersal of terrestrial snails. Kady *et al.* (1983) indicated that *M. obstructa* began to increase gradually from end of March to mid-April on Egyptian

clover, also Staikou & Lazaridou- Dimitriadou, (1990) found that population density raised in September-October, 1983 and December, 1984 & 1985, gave very low values in winter and summer and the general decline in density was observed in June. On the other hand, Ali and Suliman (1992) in Pakistan assured that *M. obstructa* remained active in most parts of the year except summer months, when density of the snail population declined to zero. They indicated that maximum population densities of *M. obstructa* immatures were observed during late spring (April- early May), and it was followed by peak density of adults in October to November. Moreover Ghamry *et al.* (1993b) said that these snails were more active during spring and autumn where temperature and relative humidity were suitable. Ismail (1997) indicated that the highest values of population density of *M. cartusiana* were found during spring months as compared to other seasons. Hegab *et al.* (1999) indicated that the population density of *Monacha cartusiana* was higher during March, April, May and June months. They found that Egyptian clover harbored the highest numbers of *M. cartusiana*. Mahrous *et al.* (2002a) illustrated that Egyptian clover harboured the highest numbers of *M. cartusiana* with increasing of their population density during spring months (March, April, and May) as compared to low or moderate values during winter and autumn months and the infestation did not appear during summer months. Moreover, Nakhla *et al.* (2002) reported that *M. obstructa* attacked the Egyptian clover fields from October and increased during the following months to reach its maximum values at the end of the season in May of the next year. Also, Shetaia (2005) reported that the highest population of the land snail *M. cartusiana* adults was recorded in May, during the two successive growing seasons 1999/2000 and 2000/01. He showed that the peaks of this snail differed from host plant to another and the Egyptian clover gained the highest values of population density. Arafa (2006) reported that the land snail *M. cartusiana* did not prefer any direction. In the cultivated land, snails moved in all directions (north, south, east and west) while in the fallow land, snails moved in the north direction only. The land snails were moved during the two first days in cultivated and fallow land a distance ranged from 0.5 to 6 m in north. Mahrous *et al.* (2006) illustrated that all snails counted during November and December were found in adult stage. It

Pakistan Ali & Suleman (1992) revealed that spring season recorded higher breeding period, followed by autumn season. Clutches had been observed in winter, while no oviposition occurred in summer months.

REFERENCES

1. **Ali, N. and Suleman, M. (1992)**. Seasonal variations of the population density and activity of the land snail, *Monacha obstructa* at Peshawar Univ. Campus. Pakistan J.Zool., 24 (1): 85-88.
2. **Arafa A.A.I. (2006)**., Studies on terrestrial molluscs in some Delta Governorates. Ph.D. Thesis, Fac. Agric., AL-Azhar Univ., 167 pp.
3. **Baker, G. H. (1988a)**. Dispersal of *Theba pisana* (Mollusca: Helicidae). J. Appl. Ecol., 25:889-900.
4. **Baker, G. H. (1988b)**. The dispersal of *Cerutuella virgata* (Mollusca: Helicidae). Aust. J. Zool. 36: 513-520.
5. **Baker, G. H. and Vogelzang, B.K. (1988)**. Life history, population dynamics and polymorphism of *Theba pisana* (Mollusca: Helicidae) in Australia. J. App. Ecol., 25:867-887.
6. **Costat. (2004) CoHort Software** WWW. CoHort. Com. Monterey, California, U.S.A.
7. **Ghamry, E.M.; El-Deeb, H.I. and Kokab, Y.A. (1993b)**. Ecological and morphological studies on certain land snails at Sharkia Governorate. Egypt. J. Appl. Sci., 8(11): 213-225.
8. **Hegab, A.M.; Ghamry, E.M.; El-Masry, S.A. and Hassan, A.I. (1999)**. Ecological studies on certain land snails in some localities at Sharkia Governorate. Zagazig J. Agric. Res., 26(38): 787-795.
9. **Heiba, F.N.; Al-Sharkawy, I.M. and Al-Batal, A.A. (2002)**. Effects of insecticide, Lannate, on the land snails, *Eobania vermiculata* and *Monacha contiana*, under Laboratory conditions. Online Journal of Biological Sciences 2(1): 8-13.
10. **Ismail, Sh. A.A. (1997)**. Ecological, biological and control of certain terrestrial snails infesting some vegetable and field crops in Sharkia Governorate. Ph.D. Thesis, Fac. Agric., Zagazig Univ., 130 pp.
11. **Kady, M.M.; El-Adl, A.A., and Nassar, O. A. (1983)**. Seasonal abundance of the terrestrial snail, *Monacha obstructa* and its chemical control. Agric. Sci. Mansoura Univ., 82(2): 377-383.
12. **Mahrous, M.E.; Ibrahim, Mervat H. and Abd El-Aal, E.M. (2002a)**. Occurrence, population density and importance value of land snails infesting different crops in Sharkia Governorate. Zagazig. J. Agric. Res. 29(2): 613-629.
13. **Mahrous, M.E.; Ibrahim Mervat, H and Abd El-Aal, E. M. (2002b)**. Control of certain land snails under field conditions in Sharkia Governorate, Egypt. Zagazig J. Agric. Res., 29(3): 1041-1054.
14. **Mahrous, M.E.; A.E. Basha; Ibrahim Mervat, H; Sh. A. Ismail and M.H. Lokma (2006)**. Observations on aestivation, dispersal and breeding season of the glassy clover snail *Monacha cartusiana* (Muller) at Sharkia Governorate. J. Agric. Sci. Mansoura Univ., 31 (8): 5487 – 5497.
15. **Mortada, M. M. (2002)**. Ecological and biological studies on certain terrestrial gastropods in Dakahlia Governorate. Ph.D. Thesis, Fac. Agric., Zagazig Univ., 183pp.

16. Nakhla, J. M.; Tadros, A. W. and El- Hawashy, Nadiá (2002). Monitoring the changes in the population activity of *Monacha obstructa* in apple orchards and Egyptian clover fields in Giza Governorate, Egypt. J. Agric. Res., 80 (1): 181-188.
17. Shetaia, S.Z. (2005). Integrated control of land snail pests in the fields of Sharkia Governorate. Ph.D. Thesis, Fac. Agric., Al-Azhar Univ. 150 pp.
18. Staikou, A. and Lazaridou - Dimitriadou, M. 1990. Aspects of the life cycle, population dynamics, growth and secondary production of the snail *Monacha cartusiana* (Muller, 1884) (Gastropoda : Pulmonata) in Greece. Malacologia, 31 (2): 353-362.
19. Staikou, A.; Lazaridou -Dimitriadou, M. and Pana, E. 1990. The life cycle, population dynamics, growth and secondary production of the snail, *Bradybaena fruticum* in northern Greece. J. Moll. Stud., 47: 137-146.

التغيرات الموسمية في الانتشار والتشتت والكثافة العددية للقواقع الارضية *Monacha cartusiana* (Muller) في حقول البرسيم المصرى بمحافظة الشرقية

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معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - جيزة - مصر

الهدف الاساسى من هذا البحث هو معرفة تشتت وانتشار الاطوار المختلفة (الافراد البالغة - الافراد غير البالغة) لقواقع البرسيم الزجاجى *Monacha cartusiana* والكثافة العددية للبيض وكُل البيض فى حقول البرسيم المصرى بمحافظة الشرقية بداية من شهر اكتوبر وحتى يونيو خلال عامى (2007-2008) ، وذلك لتحديد انسب المسافات والاقوات الملائمة لتطبيق عمليات مكافحة ضد الاطوار المختلفة لهذه الافة.

وقد اوضحت النتائج ما يلى :

- 1- سجلت الافراد البالغة اعلى كثافة عددية فى مسافة 5 ، 10 متر المجاوره لقناة الري وذلك خلال اكتوبر- نوفمبر- ديسمبر (2007) وفى مسافة 20 متر خلال مارس - ابريل - مايو (2008) بينما كانت اقل كثافة عددية فى فبراير من نفس العام. اما خلال 2009 فقد سجلت اعلى كثافة عددية فى شهرى مارس وابريل بينما سجلت اقل كثافة عددية فى يناير ولم تسجل افراد يافعة باماكن الفحص فى يونيو خلال الموسمين سجل الدراسة.
 - 2- القواقع غير البالغة لم تسجل خلال اكتوبر و نوفمبر 2007 وسجلت لأول مرة فى ديسمبر 2007 ونوفمبر 2008 وقد تزايدت الكثافة العددية تدريجيا فى يناير وبلغت اقصى قيمها فى يناير و فبراير و مارس 2008 و 2009 خاصة على بعد 5 ، 10 ، 15 متر من قناة الري باتجاه الحقل ولم تسجل فى مايو خلال الموسمين. وقد لوحظ انخفاض التعداد خلال موسم (2008 - 2009) مقارنة بالتعداد خلال موسم (2007-2008).
 - 3- سجلت كتل البيض وعدد البيض و بلغت اعلى قيم لها فى نوفمبر و ديسمبر خلال الموسمين خاصة فى المسافة 5 ، 10 ، 15 متر المجاوره لقناة الري باتجاه الحقل وقلت القيم العددية لتلك الكتل وكذلك لعدد البيض خلال يناير و فبراير ولم يسجل تواجدها فى مارس خلال الموسمين.
- وبناء على هذه النتائج فانه امكن نسبيا تحديد انسب الاوقات والمسافات التى يجب ان تطبق فيها عمليات مكافحة ضد قواقع البرسيم الزجاجى فى مختلف اطواره.