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SOME FACTORS AFFECTING LOSSES OF HONEY BEE COLONIES IN ASSIUT GOVERNORATE (UPPER EGYPT).

Zeinab H. Ahmed* A. M. Moustafa,* M. F. Abdel-Rahman, *Amer I Tawfikand Ahmed M. A. Ibrahim****

** Plant Protection Research Institute, ARC, Dokki, Giza, Egypt.*
*** Zoology **Dep., Faculty of Sci., Assiut Univ., Assiut, Egypt.*

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Rate of honey bee colonies losses in Assiut governorate during winter of the four years, 2012/2013, 2013/2014, 2014/2015 and 2015/2016, was discussed. The survey was applied on four levels of apiaries. Percentages of colonies losses and the potential causes were obtained through the questionnaire method. Results summarized responses of 148, beekeepers who's managed 20,532 colonies in September. The beekeepers had a general total loss of 3966 colonies each year during wintering period from September to March. The decline in the colonies number were, 18.37% in 2012/2013; 17.45% in 2013/2014; 18. 4% in 2014/2015 and 2015/2016 18.46%. The survey data indicated that colony losses varied widely depending on the size of the commercial and semi-commercial beekeepers (size > 200 and 101-200 colonies) lost few colonies than the hobbyist and intermediate Beekeepers. Oriental Hornet (*Vespa orientalis*); pesticides and CCD-like symptoms and poor quality queens were the main causes for colony losses as reported by most beekeepers. The survey provides information for developing strategies to mitigate colony losses and improving colony health. Finally, such a questionnaire should be circulated throughout all Egyptian governorates to understand the problem and find out the resolve.

Key words: Upper Egypt, questionnaire, Honey bee, *Apis mellifera*, mortality, colony loss, Colony Collapse Disorder (CCD), Oriental Hornet, poor quality queens.

INTRODUCTION

As, it is known that Assiut governorate is one of the oldest cities in Egypt and the capital of Upper Egypt, Which is far from Cairo the capital of Egypt nearly 234 miles southerly. The governorate consists of 11 districts. Nowadays, the hybrids from *Apis mellifer acarnica* and *Apis m. ligustica*, in addition to the original native bees of *Apis m. lamarkii* are the common bee races distributed in the governorate. The numbers of traditional hives were reduced sharply, in the test period.

The honey bees (*Apis mellifera*) management is profound interest in Assiut society. Beekeeping industry provides a full or additional income for many hundred families. In fact, honey bees are the most economical valuable pollinator and has estimated that ~ 35% of human food consumption depends indirectly or directly on insect-based pollination (Delaplane and Mayer, 2000). High rates of winter losses were recorded in honey bee colonies (*Apis mellifera* L.) in many countries, especially in Europe and North America (Neumann &Carreck, 2010; Pirk, Human, Crewe, &vanEngelsdorp, 2014; Steinhauer et al., 2014; van Der Zee et al., 2014; vanEngelsdorp, Hayes, Underwood& ، Pettis, 2008) and in Egypt (Abdel-Rahman and Moustafa,2012; Moustafa,2013 and Moustafa et al., 2014).

Interacting multiple factors drive honey bee colonies mortality including forage availability (Decourtye, Mader, and Desneux, 2010 and Moustafa, 2014), pesticide exposure (Zhu, Schmehl, Mullin, and Frazier, 2014), issues associated with the ectoparasitic mite *Varroa destructor* (Neumann and Carreck, 2010), other pests, diseases and parasites (Berthoud, Imdorf, Haueter, Radloff, Neumann, 2010 and Moustafa, 2013), as well as, many other social and economic factors (Gallai et al., 2009). Queens failure or loss is the important factors that leading to loss of colonies (Vanengelsdorp, et al., 2013 and Liu, et al., 2016). With the initial concern raised by CCD، beekeepers and scientists began monitoring colony loss rates annually (vanEngelsdorp, Underwood, Caron and Hayes, 2007; vanEngelsdorp, Hayes, Underwood, & Pettis, 2008, 2010, 2011; vanEngelsdorp et al., 2012; Spleen et al., 2013; Steinhauer et al., 2014; Lee et al., 2015 and Seitz et al., 2016), giving context to annual mortality rates، which then allows for identifying potential causes.

Data of previous surveys of Moustafa, (2013) in Assiut governorate had shown that total winter colony losses fluctuated between a low percentages 15.78% in 2009/ 2010 and 15.6% in 2011/2012 and a high percentage 28.11% in 2010 /2011. Beekeepers are closely linked winter mortality to the orintal hornets; pesticides; poor queens quality; and Colony Collapse Disorder (CCD) – like symptoms were considered as potential causes, for colony losses.

Since, environmental conditions, beekeeping practices and both host of pathogens are genetically diverse, causes and symptoms of colony loss of honey bees may be diverse in different regions (Neumann and Carreck, 2010). The objective of present study aimed to monitoring patterns and trends in colonies loss rates and data analysis to identify factors contributing the colony losses.

MATERIALS AND METHODS

This survey 0n colonies losses was conducted in Assiut, Upper Egypt (fig.1). Eleven districts were used in the survey throughout the four seasons (2012/2013, 2013/2014, 2014/2015, and 2015/2016) during wintering period from September to March. Districts, Ghanaim, Sedfa,Abu- Tig, Sahlslim, Badari, Al Fath, Abnoub, Assiut, Manfalut, Qusayyah, and Dirout were used during the present study.

The survey covered the same basic questions as winter loss survey carried out by (Moustafa, 2013). The survey method was used to estimate the losses percentages of colonies and possible causes from meeting number of 184, 86, 183 and 139 of beekeepers during study years respectively. The questionnaire consisted mainly from the following points.

1-In which area do you keep your hives؟
2- The number of alive colonies in September؟
3- The number of colonies died until March؟
4-What are the reasons attributed to the colony death؟
Varroa mite,American brood, Oriental Hornet attack, starvation, weather, poor queens, colony collapse disorder (CCD) - like symptoms and insecticide poisoning and others…

A total of 592 apiaries were used during four seasons of study . Different types of apiaries have been divided into four groups, namely commercial beekeepers (>200 colonies); semi-commercial beekeepers (101-200colonies) ;intermediate beekeepers (51-100 colonies) and hobbyist beekeepers (≤ 50 colonies) . The average number of colonies died per beekeeper until March was divided by the average number of alive colonies before winter. The losses percentages were calculated. The average rate of colony losses for each region and for each beekeepers group were calculated. The average individual operating loss was calculated to determine the difference among the four subgroups.

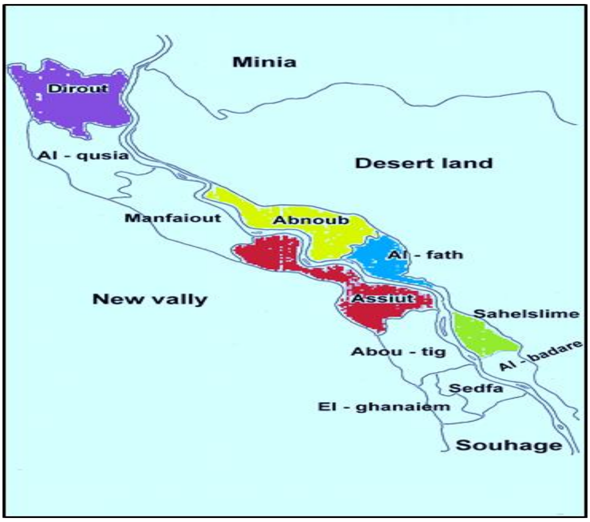

Figure 1: Visualization of the map of Assiut districts used for survey.

Statistical analyses:

colony losses percentages were convert using the method of arcsine, and (ANOVA) which were operated by using software program MSTAT-C (MSTAT-C, Michigan State University Version 2.10) . The least significant difference (LSD) values were calculated when F-value were significant for times of introduction using by the method of Waller and Duncan, 1969.

RESULTS

Honey bee colonies in Assiut governorate

Variation of total number of honeybee colonies (wooden and mud hives) during the period from 2000 - 2017 obtained from the statistics of directorate of Agriculture in Assiut governorate.

1.1. Wooden hives

Figure (2) shows the total number of honey bee colonies (hives in thousands) from season of 2000 to 2017. The total number varied from year to year and influenced by management practices, environment stresses diseases and pests. The total numbers of honey bee colonies in governorate of Assiut increased until season of 2009/2010 and decreased steadily during the season of 2011 to 2016.

1.2. Mud hives

Figure 2 shows the total number of honey bee colonies (mud hives in thousands) from season of 2000 to 2017. The total number varied from year to year and influenced by management practices, environment stresses pestes and diseases. The colonies number in the governorate of

Assiut increased during the year (2002/2003) and fell sharply in season 2006/2007.

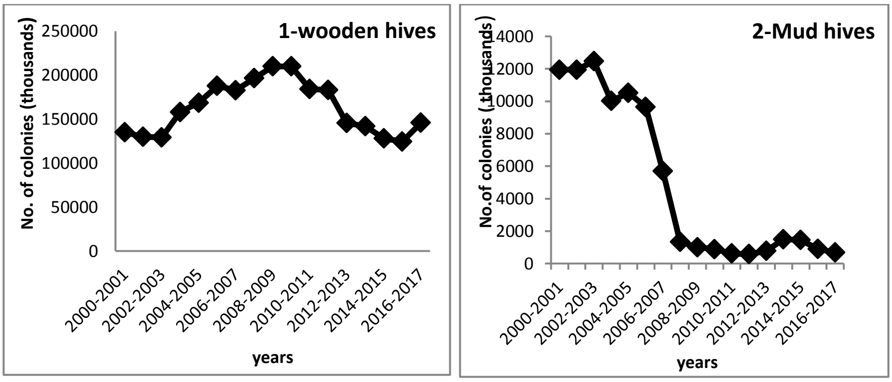

Fig. 2: Variation of honey bee colonies number (wooden and mud hive in thousands) from season of 2000 to 2017.

3-The apiaries size

Beekeepers used in the present survey were divided into four groups. In 2012-2013 seasons, beekeepers have ≤ 50 colony constituted 26% out of the sum respondents. While the percentages of 25.5, 10 and 38 % were for those have 51 - 100, 101 - 200 and > 200 colonies, respectively. During 2013-2014 season, 39.5% of respondents had ≤ 50 colonies, 23.2% of the respondents occupied with 51 - 100 colonies and 15.1% of the respondents manage of 101 - 200 colonies. Also, 22% of respondents had >200 colonies. Throughout 2014/2015 season, 31.6% of respondents owned ≤ 50 colonies. The percentage of 21.3 from the total worked with those operating from 51 - 100 colonies and 25.6% of the respondents practiced 101 - 200 colonies. The percentage of 21.3 of the respondents had > 200 colonies. On season of 2015/2016, 30.2% of respondents had ≤ 50 colonies 22.3% of the respondents worked in apiary constituted from 51 - 100 colonies and 23.7% of respondents worked large apiaries (101 – 200) and > 200 colonies.

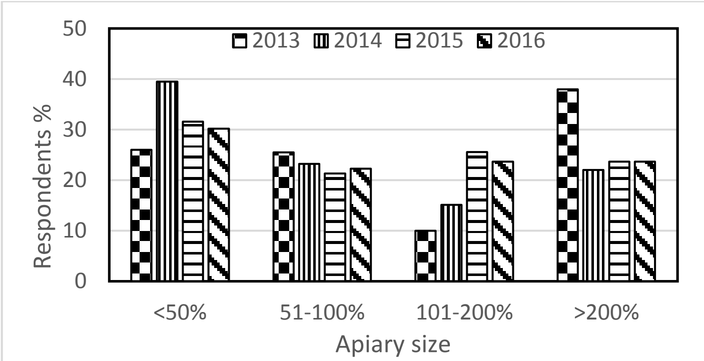

Fig. 3: Distribution and percentages of beekeeping operation size during four study

The beekeepers generally, who have given the data can be account for 30.7% of respondents operate size ≤ 50 colonies, 23.1% of respondents operate size 51 to100 colonies and 18.9% of respondents operate size 101 to 200 colonies. While nearly 27.1% of respondents operate size > 200 colonies.

(Fig. 4, B).Average total number of managed colonies was 1539 (2.8%) of hobbyist beekeepers, 2798 (5%) for intermediate beekeepers, semi-commercial beekeepers, 4591 (8.3 %) and 46411 (83.7%) for commercial beekeepers.

Losses by year:

Beekeepers responded to the questionnaire survey were one hundred and forty eight within the four seasons. Totally 20532 colonies managed in September. A total loss of 3966 colonies were lost (died) during the period from September until March. Losses of colony during the period of study represented 18.37% in 2012/2013; 17.45% in 2013/2014; 18.4% in 2014/2015 and 18.46% in 2015/2016 season (Fig.4). Colony losses in 2012-2013; 2014/ 2015 and 2015 / 2016 were slightly high in comparison with 2013/2014 season.

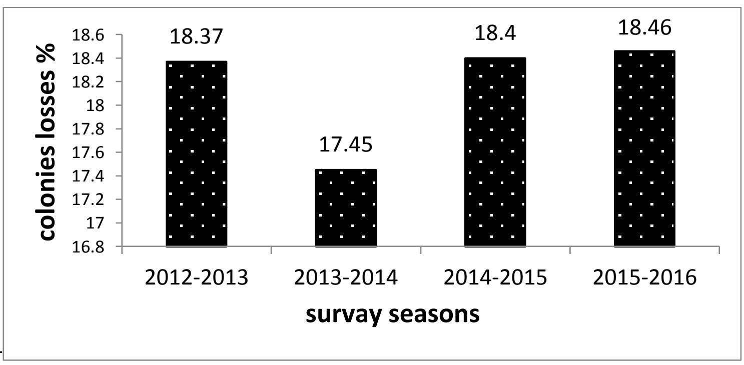

Fig. 4: Averages of colony losses percentage of four seasons of.

Losses in reference to studied district:

The number of honey bee colonies and losses percentages for eleven

districts	Colony losses (No. and %)												General mean of Losses %
	2012/2013			2013/2014			2014/2015			2015/2016			
	No. Co alive Sep. 2012	No. Co losses Mar. 2013	Losses %	No. Co alive Sep.. 2013	No. Co losses Mar. 2014	Losses %	No. Co alive Sep.2015	No. Co. losses Mar. 2016	Losses %	No. Co alive Sep.. 2016	No. Co. losses Mar 2017	Losses %	
Dirout	927	188	20.28	520	90	17.31	2330	387	16.6	838	248	29.59	20.95
Abnoub	1257	164	13.05	935	109	11.66	5366	1429	26.6	1116	262	23.48	18.7
Manfalot	5171	1191	23.03	5241	1192	22.74	7120	1103	15.5	9191	1660	18.06	19.83
Sedfa	60	15	25	715	209	29.23	2120	274	12.9	25	0	0	16.79

districts are summarized in Table (1). It may be noted that, there were high variation in general means of colonies losses percentages (ranged. between 7.87 to 23.31). The results showed that during the four seasons of study (2012/2013, 2013/2014, 2014/2015 and 2015/20126) beekeepers lost 18.37%, 17.45%, 18.4% and 18.46% of their bee colonies, respectively. The present results showed that, the lowest of loss was recorded in 2013/2014 .

Assiut	3455	583	16.87	1574	206	13.09	3546	853	24.1	3357	793	23.62	19.41
Albadare	1204	296	24.58	360	61	16.94	1172	332	28.3	6470	927	14.33	21.05
Apo-tig	795	165	20.75	1200	100	8.333	560	52	9.29	147	22	14.97	13.33
El ghanaiem	35	0	0	35	0	0	113	13	11.5	135	27	20	7.876
Al-qusia	590	85	14.41	131	36	27.48	633	147	23.2	117	19	16.24	20.34
Al-fath	1645	342	20.79	1053	205	19.47	3846	682	17.7	2873	448	15.59	18.4
Sahelslie	1352	315	23.3	1184	304	25.68	1068	182	17	544	148	27.21	23.31
Total and general means of losses%	16491	3344	18.37	12948	2512	17.45	27874	5454	18.4	24813	4554	18.46	18.18

Table (1): The total numbers of honey bee colonies and losses percentages in Assiut Governorate districts throughout the four seasons.

Losses in reference to the operation size:

From statistical analysis there were significant differences in honey bee colonies losses among the operation size. Comparing the average losses percentages across operation size statistically, the sme-commercial and commercial operations size was differed insignificantly but the between operations size of ≤ 50 and 51-100 colonies differed significantly (Table 2).

Table (2): Average colonies losses percentages experienced by all responds beekeepers grouped by operation sizes throughout four seasons.

The apiary size	Mean No. of beekeepers	No. of Colonies in Sept.	Average colony losses %
≤ 50	45.5	1539.25	31.27 a
51 to100	34.25	2798.5	23.17 b
101 to 200	28	4591	18.02 c
> 200	40.25	11602.75	17.5 c

Mean followed by the same letter in the same column is not significantly different ($P < 0.05$)

The number of honey bee colonies and losses percentages were recorded due to the size of apiary in Table (3) and illustrated in Fig. (5). There were a considerable differences in the percentage of losses incurred with the apiary size. The high losses percentage was observed at 43.2% and 22.9% in the groups colonies of sizes ≤ 50 and 101 to 200, respectively. However, the two low percentages of losses (16.1% and 17.3%) were recorded in the apiray size more than 200 and 101 to 200 colonies, respectively during season of 2013/2014.

Table (3): Total and losses percentages experienced of Assiut governorates during the four years.

Wintering seasons	No. of respondents and % colony losses	Apiaries size	Total No. and

						general losses%
		≤ 50	51-100	101-200	>200	
2012/2013	Respondents	48	47	19	70	184
	Alive colonies No. in Sep. 2012	1730	3907	3354	7500	16491
	Died colonies No. in March, 2013	444	952	522	1426	3344
	% of losses	25.6	24.4	15.6	19	20.3%
	Rank	1	2	3	4	
2013/2014	Respondents	34	20	13	19	86
	Alive colonies No. in Sep .2013	1058	1635	2100	8155	12948
	Died colonies No. in March, 2014	458	376	365	1313	2512
	% of losses	43.2	22.9	17.3	16.1	19.4%
	Rank	1	2	3	4	
2014/2015	Respondents	58	39	47	39	183
	Alive colonies No. in Sep .2014	1846	3087	8075	14866	27874
	Died colonies No. in March, 2015	535	579	1361	2979	5454
	% of losses	28.9	18.7	16.8	20	19.6%
	Rank	1	2	3	4	
2015/2016	Respondents	42	31	33	33	139
	Alive colonies No. in Sep .2015	1523	2565	4835	15890	24813
	Died colonies No. in March, 2016	417	686	1084	2367	4554
	% of losses	27.4	26.7	22.4	14.9	18.3%
	Rank	1	2	3	4	

In 2012/2013 season, the present results shows the same trend. The highest losses percentages of 25.6% and 24.4% were recording for apiaries size ≤ 50 and 51-100 colonies, while the low percentages of loss were 15.6%, 19% for the apiaries size 101-200 and > 200 colonies. The high decline were observed in 28.9% and 20% for the apiaries size ≤ 50 and > 200 collective colonies in 2014/2015 season. The low loss percentages were 18.7% and 16.8% for the size apiaries of 51 to 100 and 101 to 200 colonies in the same year. The same direction was recorded in 2015/2016 with a high loss rate of 27.4% and 26.7 for apiaries size 50 50 and 51-100

colonies. While, the low loss percentages 22% and 14.9% for the apiaries size of 101-200 and > 200 colonies were observed

Generally, present data illustrated in fig. (5) showed that the colonies losses levels was widely changed among the different sizes. It is clear that smaller operations get larger losses than larger operations. The general means of colonies losses percentages (31.27; 23.17; 18.02 and 17.5%) were obtained for hobbyist; intermediate; semi-commercial and commercial beekeepers, respectively.

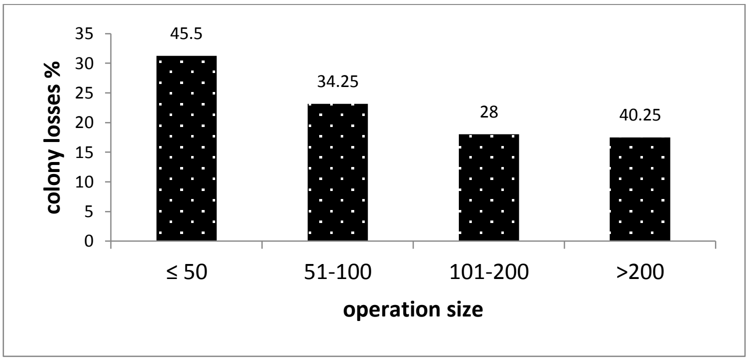

Fig. 5: General mean colonies losses percentages of apiaries sizes during the four seasons, of study.

Factors affecting of honey bee colonies losses within the different operation size represented in Table (4) and illustrated in Figure (6). The causes of varied widely among the groups of apiaries size. The group of small apiaries are more suffered from oriental hornets than largest one. While, the largest apiaries are more like too suffered from pesticides than smaller one .

Table(4): factors affecting the colony losses during four seasons of study.

Apiaries size	Means (four season) No. of colonies losses and percentages of factors affecting									
		Oriental hornets	Varroa mite	AFB	CCD-like symptoms	Pesticides	Weather	Poor queens	Starvation	management
	Mean	325.95	34.35	57.5	222	39.2	63.9	98.6	54.7	7.22
≤ 50	Losses %	36.07	3.8	6.36	24.57	4.34	7.07	10.9	6.05	0.799
	Mean	189.2	50.2	49.05	112.7	41.8	48.6	59.2	21.8	16.54
51-100	Losses %	32.12	8.52	8.32	19.13	7.09	8.25	10	3.69	2.8
	Mean	64.4	84.6	74.75	111.2	53.7	40.9	128	22.9	15.9
101-200	Losses %	10.8	14.19	12.54	18.66	9.01	6.86	21.4	3.84	2.67
	Mean	141.1	153.3	104.6	194.8	235.7	85.45	142	19.7	67.7
> 200	Losses %	12.33	13.39	9.14	17.02	20.58	7.46	12.4	1.72	5.91

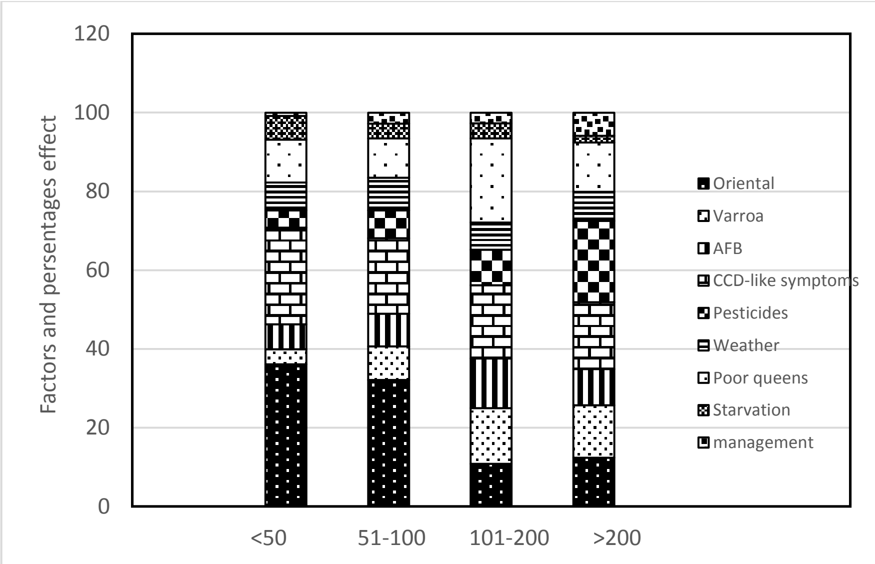

Fig. 6: Potential causes as reported by the beekeepers during four seasons.

The Perceived loss reasons :

The answers of beekeepers about the reasons of colonies losses in their apiaries were calculated as percentages during the four seasons of study (table 5) they mentioned nine different potential causes four colony losses. The importance of these reasons were clearly differed among the four years of study. For instance, attacking Oriental hornet, *Vespa orientalis,* it caused 19.85; 53.98%, 23.1% and 9.87%, of colony losses during four seasons of study, respectively. Exposure of pesticides caused 17.8%. 26.96%, 18.86% and 4.31% of colony losses during four seasons of study, respectively. The percentages of honey bee colonies losses by infection of American foulbrood (AFB) had low values. It ranged between 9.64% in 2012/2013 season to 1.73% 2015/2016, season. The factor of poor queens was responsible for colony losses by 6.63; 14; 11.7 and 25.47% during the four seasons of study, respectively.

Table (5): The commonly factors perceived for colonies losses by beekeepers in Assiut governorate during four seasons.

factors	Seasons				General mean	Rank
	2012/2013	2013/2014	2014/2015	2015/2016		
Oriental hornets	19.85	53.89	23.1	9.87	26.7	1
Varroa mite	12.22	15.6	8.63	10.03	11.62	5
AFB	9.64	4.52	8.76	1.73	6.16	7
CCD Like symptoms	21.09	15.36	7.06	24.03	16.88	3
Pesticides	17.81	26.96	18.86	4.31	16.91	2
Weather	8.4	6.55	10.9	10.18	9.00	6
Poor queens	6.63	14	11.71	25.47	14.45	4
Starvation	1.32	3.42	0.99	13.14	4.71	8
management	3.44	3.03	6.03	2.07	3.64	9

DISCUSSION

Information quantifying the honey bee colonies losses has been collected for Assiut governorate. This is an important dataset that will all subsequent fluctuations to be properly monitored. Percentages of winter colonies losses was (18.17 %), the results of this survey is slightly higher than winter losses reported by Moustafa, 2013. Colonies losses in 2015/2016 was higher in comparison to data obtained in three previous seasons. The present data is agreement with Abdel-rahman and Moustafa, (2012) who recorded that the colonies losses in season of 2010-2011 was the highest during fall and winter season in Qena ande Luxor Governorates (Upper Egypt) where beekeepers lost about 30.73% of their colonies. In the present results the distribution of colony losses during four seasons of study 2012/2013, 2013/2014. 2014/2015 and 2015/2016, showed different variation among Assiut districts.

The findings from Moustafa survey in 2013 season had been verified that small apiaries with 50 colonies or less showed an increase in total winter losses percentages this results is agreement of data obtained by Abdul Rahman and Mustafa, 2012 and Mustafa, 2013. This result suggest that management of apiary playing an important role in colonies losses during season. Apiaries of the small group are usually kept to make some extra money and the main source of income lies out-side beekeeping. Therefore, beekeepers often cannot devote sufficient time to dealing with their problems or to control bee diseases infestations. Besides, probability due to they have not enough experiences. Therefore professional management may have played an important role in preventing losses. Higher losses in Poland (Topoulska et al., 2008) and in Israel it was also found in small operations (Sorocker et al., 2011) but not in the United States (vanEn-gelsdorp et al., 2008).

In previous Assiut surveys, carried out by Moustafa (2013), the most common causes of colony death recorded by beekeepers were oriental hornets; poor quality queens; insecticides and colony disorder (CCD) -like symptoms. In the survey, oriental hornets (*Vespa orientalis*); insecticides and poor quality queens were the more effective factors. In contrast to Mustafa (2013) survey, CCD-like symptoms were reported with high frequency. CCD was the third most common cause among beekeepers resons (Table 5). Survey data indicate that about 26.7% of all colonies lost during 2012/2013, 2013/2014. 2014/2015 and 2015/2016, died by the oriental hornets. Hussein and Shoreit (2000) recorded that the oriental hornets strongly attacking honey bee colonies upper Egypt. They recorded that it is major predators of honey bees colonies it is the main factors for destroying the apiaries.

The reason(s) for the consistently high/low mortality in Assiut districts remains to be explored. However, For example, Al-badari, Abnoub and Assiut district have high colonies losses percentages 28.3, 26.6, and 24.1%, respectively than other districts. High colonies losses may partially be explained by poor nutrition due to change in cultivation and decreasing forage availability.

The primary perceived problem for beekeepers was queens with poor quality (14.45% out of colony losses). Beekeepers in Assiut tend to buy the virgin queens from commercial rearing queens rather than rearing queens themselves. These queens often have poor quality as recorded by Zeinab, 2015). In the USA, queens with low quality and colonies starvation played a major role in the losses of the colonies from autumn 2007 to spring 2008 (vanEngelsdorp et al., 2008). Quality of queen's is not only a function of her own reproductive potential, but also how well the queen is mated. Camazine et al. (1998) estimated the number of sperm count in the spermathecae of 325 queen from 13 different commercial queen breeders. They recorded that 19% of tested queens were "poorly mated" (i.e., carry less than 3 million sperm), as defined by Woyke (1962).

The number of stored sperm, is not the only parameter for queen mating success. Queens are highly polyandrous, mating with an average of 12 drones on their mating flight(s) early in life (Tarpy and Nielsen, 2002). It has been shown that polyandry, and the resultant intracolony genetic diversity of the worker force, confers numerous benefits to a colony (reviewed by Palmer and Oldroyd, 2000). First, genetic diversity may increase the behavioral diversity of the worker force (Fuchs and Schade, 1994; Moritz and Fuchs, 1998; Mattila and Seeley, 2007), such as enabling colonies to exploit different foraging environments more efficiently (Lobo and Kerr, 1993; Mattila et al., 2008) or providing a buffer against fluctuations in the environment (Oldroyd et al., 1992; Page et al., 1995; Jones et al., 2004). Second, genetic diversity may reduce the impacts of diploid male production as a consequence of the single-locus sex determination system (Page, 1980; Ratnieks, 1990; Tarpy and Page, 2002). Third, genetic diversity may reduce the prevalence of parasites and pathogens among colony members (Hamilton, 1987; Sherman et al., 1988; Palmer and Oldroyd, 2003; Tarpy, 2003; Cremer et al., 2007; Seeley and Tarpy, 2007; Wilson-Rich et al., 2009). Thus determining the number of mates by a queen, and not just the number of sperm, is one final measure of a queen's reproductive quality. Determining the factors that result in low-quality queens is therefore of fundamental importance for improving colony productivity and fitness.

In the present results, the essential symptom of CCD was the third common factor of all lost reasons with mean percentage 16.68% during the four seasons of study. As a result of climatic differentiation, there are differences among the countries and the regions for reasons lead to colony losses. Malnutrition is a stress to bees, possibly weakening the bee's immune system. A weak immune system can affect bees ability to fight pests and diseases as well as immunosuppressant may be caused by pathogen or parasite attack (Glinski and Kostro, 2007). In Canada and Poland, *Nosema spp* and *Varroa destructor*. played the same role in colony losses during the winter of 2007/2008 (Pernal,2008). In addition to *Varroa destructor*, the causes of colony losses in Saudi Arabia are adverse climatic conditions the most clear in the country (Al-Ghamdi et al., 2013, Al-Qarni et al., 2011). A mixture of original research articles; address the possible causes of honey bee colonies losses: virus (Berthoud et al., 2010; Carreck et al., 2010 a, b; Martin et al., 2010); *Nosema ceranae* (Paxton, 2010; Santrac et al., 2010); *Varroa destructor* (Carreck et al., 2010 b; Dahle, 2010; Martin et al., 2010); Pesticides (Chauzat et al., 2010; Me-drycki et al., 2010); the effects of acaricides (Harz et al., 2010); the loss of genetic diversity (Meixner et al., 2010) and loss of the habitats (Potts et al., 2010). Scientists are investigating the lack of genetic diversity and lineage of bees, both related to queen quality, as possible causes of CCD. This lack of genetic biodiversity can make bees increasingly susceptible to any pest or disease that invades the system. The importance of genetic diversity has been noted at the individual, the colony, the population, subspecies level in honeybees. There are examples of reduced fitness at the individual and colony level, due to reduced genetic diversity.

Increasing rates of colony losses in Upper Egypt are probably the result of regional differences in weather patterns that affected forage availability of bees; starvation; *Vespa orientalis*; foulbrood and other diseases, in addition to poor quality queens and pesticides. These stresses interacting in combination with each other affected colony survival are believed to be the most important factors related to colony loss.

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بعض العوامل المؤثره على فقدان طوائف نحل العسل في محافظة أسيوط (صعيد مصر) .

زينب حمزه أحمد* وأدهم مصطفي مصطفي* و محمد فتح الله عبد الرحمن* و امر أبراهيم توفيق و أحمد مصطفي عبد الرحيم ابراهيم****

*** قسم بحوث النحل – معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقي – الجيزه – مصر**

*** قسم الحيوان – كلية العلوم – جامعة أسسيوط – اسيوط - مصر**

يوثق هذا المسح ، معدل فقدان طوائف نحل العسل في محافظة أسيوط خلال شتاء مواسم ٢٠١٣/٢٠١٢ ، ٢٠١٤/٢٠١٣. ٢٠١٥/٢٠١٤ و ٢٠١٦/٢٠١٥ ،تم حصر الطوائف المفقودة والأسباب المحتملة باستخدام طريقة الاستبيان. تم تلخيص نتائج ١٤٨ نحالا يقومون بإدارة ٢٠٥٣٢ طائفة نحل في سبتمبر. كان لدى مربي النحل الذين خضعوا للدراسة خسارة بأجمالي ٣٩٦٦ طائفه خلال الفترة من سبتمبر وحتي مارس من كل عام. بلغت النسبة المؤيه للفقد ١٨.٣٧و ١٧.٤٥ و ١٨.٤و ١٨.٤٦ في مواسم الدراسة الأربع علي التوالي . تشير نتائج الحصر علي ان فقد الطوائف اعتمد بصورة كبيرة علي نوعية النحالين . فقد وجد ان النحالين الهواه الذين يتعاملون مع أقل من ٥٠ طائفة لديهم اجمالي خسائر أكثر بالمقارنة مع النحالين التجارين أو المتوسطين أو شبه تجاريين . وقد سجل معظم النحالين أن دبور البلح والتسمم بالمبيدات والأعراض المشابهه لأختفاء النحل والملكات الرديئة تعتبرأهم الأسباب التي تؤدي لفقد طوائفهم . هذه الدراسات الاستقصائية توفر معلومات عن الاتجاهات في خسائر طائفة نحل العسل و تطويرالأ ستراتيجيات للتخفيف من خسائرفقدان الطوائف وتحسين صحة النحل. ويمكن التوجيه بتعميم مثل هذا الأستبيان في عموم محافظات مصر للوقوف علي حجم المشكلة ومحاولة استيعابها وأيجاد الحلول المناسبة لها.