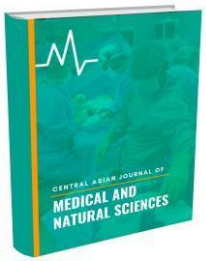

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Article

Chrysomya Bezziana Infestation Epidemiological Study in Dhi-Qar Ruminants

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Abstract: This study investigated the epidemiology and clinical characteristics of Chrysomya bezziana infestation in ruminants in selected districts of Dhi-Qar city, Iraq. Over the study period, 623 ruminants 60 cows, 545 sheep, and 18 goats were examined, revealing varying infestation rates across species, with sheep being the most susceptible 87.4%, followed by cows 9.6% and goats 2.8%. Clinical signs included abrasion wounds, reduced appetite, weight loss, and nasal discharge. Inadequate shearing practices among sheep contributed to heightened susceptibility. The findings emphasize the importance of targeted control measures and improved husbandry practices to mitigate the economic and welfare impacts of screwworm infestation in ruminant populations, underscoring the need for further research to develop effective prevention and control strategies.

Keywords: Epidemiological, Clinical, infestation, Chrysomya bezziana, Dhi-Qar.

1. Introduction

Chrysomya bezziana Villeneuve and Cochliomyia hominivorax Coquerel, have an outrageously comparable biological, ecological and behavioral matters [1], obligative parasites of ruminants in their icterical phases, inflicting traumatic myiasis. C. bezziana is limited to the America, anyway C. hominivorax is found over crosswise sub-Saharan continent, Asia, and furthermore the inlet region of the Arabia [2]. In Iraq the pathogen was affirmed by the FAO cooperative institute on Myiasis insects and diagnosis at explanation deposit London, U.K. [3]. Recognizable pieces of proof were bolstered the portrayals given by [4] and [5] Samples were affirmed by the explanation deposit in Baghdad. In the two years of the investigation, the the month to month incsect case frequency crested inside the time generally harvest time to late-fall and declined pointedly in spring, coming to decrease during the long, sweltering and summer [6]. Hot and wet conditions don't appear to be experienced in Iraq and the weather is determinant for fly development. Chrysomya bezziana infest a ruminant animals and human being tissue affected or increase mortality in serious cases [7]. Chrysomya bezziana is an obligatory parasite for mammals [5] .The primary registration of chrysomya bezziana in Iraq are in animals [8] .Host recorded enclosed cows, sheep , goats ,buffalo ,chicken ,cat ,horse and man [9,12]. Damaged tissues or injuries in animals or human susceptible for fly to lead its eggs to propagation and spawn of fly caused a disease confirmed in target ruminant animals [10,11,12]. Iraqi climate assumes reasonable job for causative fly infestation at 22-26◦C with 40-60% humidity [11]. [13] Demonstrated that the practicality of frequency of OWS halted at 40C◦ and beneath of 10◦C

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2. Materials and Methods

The study was conducted from April 11, 2015, to September 25, 2016, at veterinary hospital areas under the Ministry of Agriculture. A total of 60 cows, 545 sheep, and 18 goats were examined, with infested animals diagnosed and recorded weekly. Clinical inspections were conducted, and larvae extracted from wounds were sent to the veterinary laboratory for confirmation.

Figure 1 Extracting of the larvae from the infested animal.

Figure 2 The extracted larvae of Chrysomya bezziana.

3. Results

Infestation rates were found to be 9.6% in cows, 87.4% in sheep, and 2.8% in goats. Clinical signs included abrasion wounds, loss of appetite, weight reduction, and nasal discharge. Treatment involved surgical extraction of larvae, followed by sterilization and medication. Statistical analysis revealed significant variations in infestation spread based on factors such as month, genus, weight, age, and area.

4. Discussion

Infestation by months of the year

Through the spots of injuries were recorded within the regions considered, the number of inspected animals in those areas were 623 heads, number of infested animals were 342 heads, while the number of non-infested animals were 281 heads and total percentage of infestation were 54.89 %,in addition to, the environmental humidity and temperature were ranged by 82-24.2 % and 14-46 C^0 respectively and partitioned by months of the year, and the highest percentage of infestation was 79.24% in January whereas, the lowest percentage of infestation was 10.44% in March. Table 1.

Table 1 Distribution of infestation by months

Months	Enviro. Temp.C^0	Enviro. Humidity%	inspected animals	NO. infested	NO. non infested	Over all % prevalence of infested animals
January	14	82	53	42	11	79.24
February	16	65	65	48	17	73.84
March	20	53	67	7	60	10.44
April	26	45	54	40	14	74.07
May	35	35	39	10	29	25.64
June	39	26.4	39	12	27	30.76
July	43	24.2	49	17	32	34.69
August	46	29.4	40	13	27	32.50
September	37	38.5	49	37	12	75.51
October	29	52.6	58	40	18	68.96
November	23	68.4	64	48	16	75.00
December	15	73.3	46	28	18	60.86
Total	-----	-----	623	342	281	54.89

X2= 124.31, (P) value = 0.001 Highly obvious differences were noticed in the prevalence of infested larvae amongst diverse examination months with higher incidence infestation with January, Sept and November as in Table 2, Figure 3.

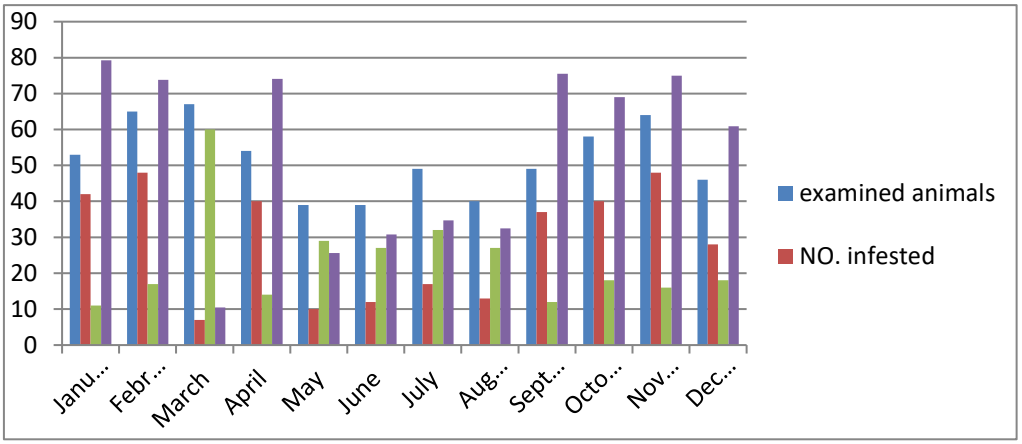

Figure 3 Infestation by months

Infestation by Genus of the animals

The Table 2 demonstrated the number of male infested animals in those regions were 116 heads, number of male non-infested animals in those areas were 214 heads and the total percentage of infestation was 35.15%. Whereas , number of female infested animals were 226 heads, number of female non-infested animals were 67 heads and total percentage of infestation were 77.13%, and the highest percentage of infestation in males was 37.5% at age 25-27 months and the lowest percentage of infestation in males was 10% at age 1-3 months whereas, the highest percentage of infestation in female was 88.8% at age 1-3 months and the lowest percentage of infestation in males was 50% at age 4-6 months.

Table 2 Distribution of infestation by Genus

Age/ month	Male			Female		
	NO. infested	NO. non infested	Percentage of infestation	NO. infested	NO. non infested	Over all % of prevalence of infested animals
3 – 1	1	8	10	6	3	**66.66**
6 – 4	4	12	14	5	5	**50.00**
9 - 7	3	16	15	13	6	**68.42**
12-10	11	13	37	17	4	**80.95**
15-13	13	24	35	24	3	**88.88**
18-16	17	19	47	30	4	**88.23**
21-19	20	24	45	34	5	**87.17**
24-22	22	30	42	27	6	**81.81**
27-25	9	15	37.5	31	8	**79.48**
30-28	7	22	24	16	7	**69.56**
33-31	5	16	23	13	9	**59.09**
36-34	4	15	18.18	10	7	**58.82**
Total	116	214	35.15	226	67	**77.13**

X2= 65.41, (P) value = 0.002 Highly obvious differences were noticed in the incidence of infested larvae through different experimental months in genus, male whereas, X2= 25.31, P – value = 0.013 Highly significant differences were ascertained within the spread infestation among various study months in Genus, Female however, female was highly infested than male up to 77.13%. Table No. 3, Figure 4.

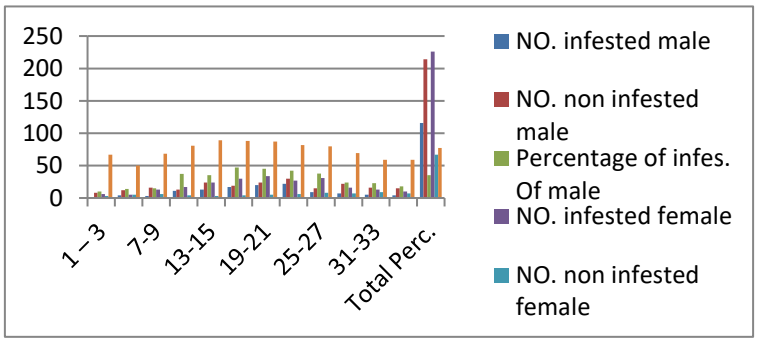

Figure 4 Infestation by Genus

Infestation by Body weight of the animals

The Table 3 viewed the number examined animals in those areas were 623 heads, number of infested animals 342, While number of non-infested animals were 281 heads, and total percentage of infestation were 54.89% according to the body weight. the highest percentage of infestation was 62.29% at body weight 240-270 Kg, and the lowest percentage of infestation in males was 33.3% at age 0-30 months Figure 5.

Table 3 Distribution of infestation by Body Weight

Body Weight	examined animals	NO. infested	NO. non infested	Over all % of prevalence of infested animals
0-30	12	4	8	**33.33**
30-60	24	11	13	**45.83**
60-90	46	18	28	**39.13**
90-120	54	22	32	**40.74**
120-150	59	32	27	**54.23**
150-180	68	40	28	**58.82**
180-210	64	39	29	**60.93**
210-240	61	35	26	**57.37**
240-270	61	38	23	**62.29**
270-300	58	35	23	**60.34**
300-330	64	40	24	**62.50**
330-360	52	28	20	**53.84**
Total	623	342	281	**54.89**

X2= 21.64, (P) value = 0.042 significant differences were seen in the incidence of causative larvae along body weight however, in 240-270 and 300-330 kg/ body weight were infested higher than other weights up to 62.29% and 62.50% respectively, as in Table 3.

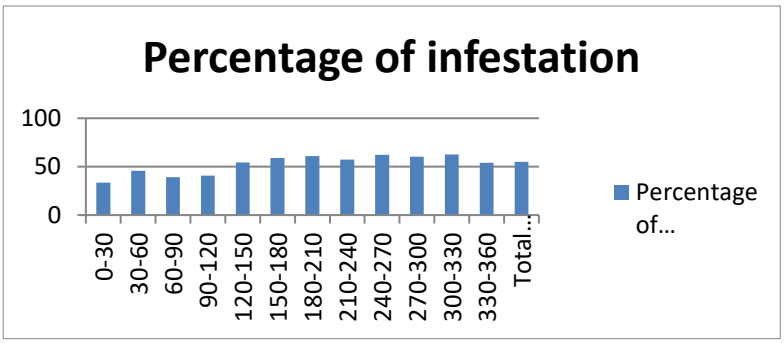

Figure 5 Distribution of infestation by Body Weight

Infestation by age of the animals

The Table 4 explain the number examined animals in those areas were 623 heads, number of infested animals 342, While number of non-infested animals were 281 heads, and total percentage of infestation were 54.89% according to thedifferent months of age of animals. the highest percentage of infestation was 67.14% at 16-18 months of age, and the lowest percentage of infestation in males was 27.7% at 1-3 months of age Figure 6.

Table 4 Infestation by age of the animals

Age/month	examined animals	NO. infested	NO. non infested	Over all % of prevalence of infested animals
3 – 1	18	5	11	27.77
6 – 4	26	9	17	34.61
9 – 7	38	16	22	42.10
12-10	45	28	17	62.22
15-13	64	37	27	57.81
18-16	70	47	23	67.14
21-19	83	54	29	65.06
24-22	85	49	36	57.64
27-25	63	40	23	63.49
30-28	52	23	29	44.23
33-31	43	18	25	41.86
36-34	36	16	22	44.44
Total	623	342	281	54.89

X2= 36.78, (P) value = 0.001 Higher significant differences were recorded in the incidence of (OWS) larvae through various study age of infested animals especially higher prevalence of (OWS) larvae infestation in age however in 16-18 and 19-21 months/age were infested higher than other ages up to 67.14% and 65.06% respectively, as in Table 4.

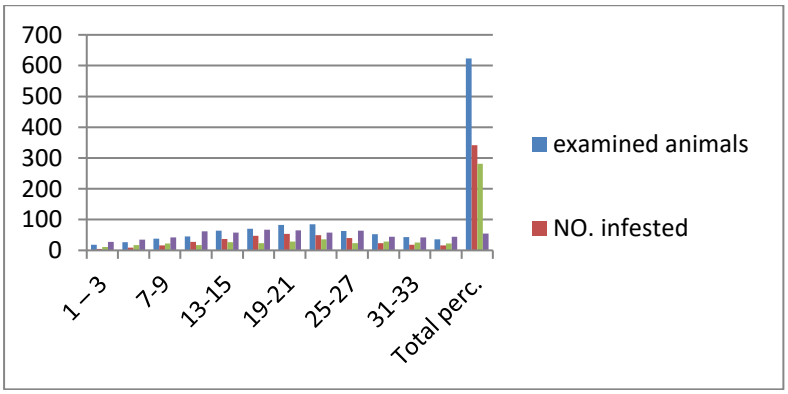

Figure 6 Distribution of infestation by months of age

Infestation by Area of infestation of the animals

The Table 5 clarify the Percentage of infestation of examined animals in Rifa'i area were 51.90%, the Percentage of infestation of examined animals in Shatrah area were 55.82%, the Percentage of infestation of examined animals in (Gharaf) area were 54.11%, while the Percentage of infestation of examined animals in (Nasiriya) area were 56.14% according to the various areas of infestation of the animals. the highest

percentage of infestation was 56.14% in (Nasiriya) area, and the lowest percentage of infestation in males was 51.90% in (Rifa'i) area of infestation Figure 7.

Table 5 Infestation by Area of infestation of the animals

Area/Province	examined animals	NO. infested	NO. non infested	Over all % of prevalence of infested animals
Rifa'i	131	68	63	51.90
Shatrah	163	91	72	55.82
Gharaf	85	46	39	54.11
Nasiriya	244	137	107	56.14
Total	623	342	281	54.89

X2= 0.205, (P) value = 0.995 No obvious differences were recorded in the incidence of (OWS) larvae throughout different study area of infestation excluding a higher incidence of (OWS) larvae in (Nasiriya) area was infested higher than other areas up to 56.14%, as in Table 5.

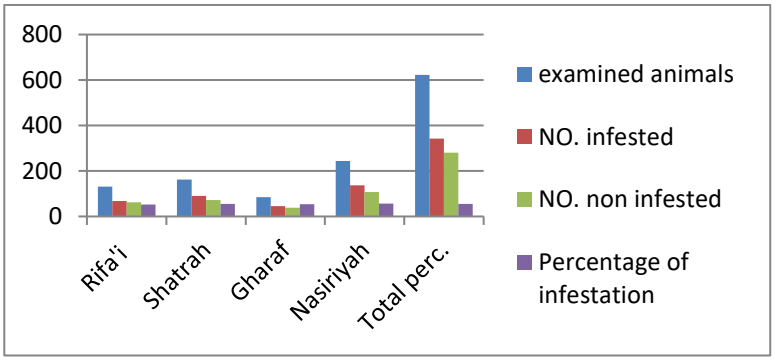

Figure 7 Infestation by Area of infestation of the animals

Infestation by type of infested animals

The Table 6 clarify the Percentage of infestation of examined animals in Cattle were 13.66%, the Percentage of infestation of examined animals in Sheep were 57.43%, while the Percentage of infestation of examined animals in Goats were 44.44%, according to the different types of of the animals Figure 8.

Table 6 infestation by Type

Animal type	examined animals	NO. infested	NO. non infested	Over all % of prevalence of infested animals
Cattle	60	19	41	13.66
Sheep	545	313	232	57.43
Goats	18	8	10	44.44
Total	623	342	281	54.89

X2= 27.78, (P) value = 0.000 Highly significant differences were detected in the incidence of (OWS) larvae throughout various study type of animal with higher prevalence of (OWS) larvae infestation in Sheep and Goats types were infested higher than Cattle up to 57.43% and 44.44% respectively, as in Table 6.

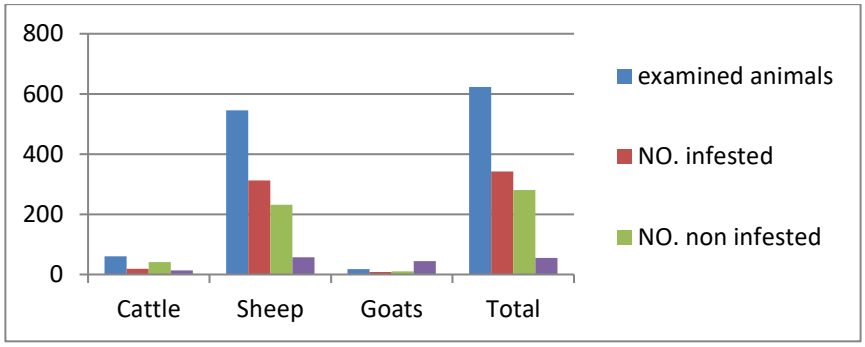

Figure 8 infestation by Type of infested animals

As indicated by Table 1, Highly significant P>0.05 differences was recorded in the incidence of (OWS) larvae among several study months with higher incidence of (OWS) larvae infestation in January, Sept and November.The reason behind high infestation in animal by OWS during these months because of high humidity and mild to low temperature that a inclining factors for infestation and concurred with [15] who said that hot and humid conditions have indispensable job in the proliferation of illnesses. [16] revealed the comparative outcomes for rhinal infestation, a total of seven hundred as well as seventy-one camels 58.1% were diagnosed with this infested larva, and the ratio of incidence was significantly different more prominent in the lower temperature months 69.8% contrasted with those of high temperature months 36.2% and afflict 15 that they found the contrast results. Notwithstanding, [17] Reveal a higher infestation in summer and spring and lowest incidence in the winter and fall months. Additionally, [18] recorded a greatest wealth of *Chrysomia* flies in May and least in January. This investigation is concurred with [12] who found, the elevated cases of infestations by the causative parasite at September to December in south of Iraq. The causative fly tolerates a warm weather 60°C and lower ones at zero 0-60°C. 30°C as an average [10]. Throughout summer, the animals were kept indoors throughout the day where the indoor humidity was low; keep away the hot outdoor and dry climate 43–46°C. The same conditions are sufficient to murder and crumble pupae as affirmed by [19]. This result is in concurrence with those of [20] and [21] wherever, only a few larvae or none were collected throughout summer.

Highly significant P>0.05 differences were monitored in the incidence of *Chrysomia* larvae along different study months in Genus, Male Table 2. These outcomes are concurred with [16] they reported. In male Dromedary, the incidence was 49.55% as in comparison to those of the female Dromedary 57.2%. And concurred with [22], they found that female animals were more significantly infested $p = 0.0001$ than males, The result of sex -related manner may be as a result of changes in hormones and inefficient tendencies of females especially under fixed system where flies get gradually occasion to invade the wounded skin or animals suffered from diarrhea. Soiled-urine buttocks in ewes entice flies and attack the skin.

A significant P>0.05 differences was noticed in the incidence of (OWS) larvae among various study body weight anyway in 240-270 and 300-330 kg/ body weight were infested higher than other weights up to 62.29% and 62.50% respectively, as in Table 3. This could result to good body condition and body weight in addition to high level of blood protein and fluids of the infested animal to make food sources are available and other ecological factors.

While, highly significant P>0.05 differences were assigned in the incidence of *Chrysomia* larvae among different study Age of infested animals especially higher incidence of *Chrysomia* larvae infestation in age however in 16-18 and 19-21 months/age were infested higher than other ages up to 67.14% and 65.06% respectively, as in Table 4. Notwithstanding, higher obvious variation P>0.05 was recorded with different age groups due to diverse months of the infestation. It signalizes that immunity titer oscillates throughout diverse ages and weather conditions of the various months assume crucial job for the infestation. These results were concurred with the lower incidence rate in camels lower than 1-year-old 23.08% in contrast to those of 3-5 55.26% and 5-7 years old 69.53% [22], also documented by [23]. This investigation is concurred with [22] who found that prevalence rate of 11.0% and 13.0% were found for young and adult sheep and goats respectively.

The Table 5 clarifies the Percentage of infestation of examined animals according to the different areas of infestation of the animals. The highest percentage of infestation was 56.14% in (Nasiriya) area, and the lowest percentage of infestation in males was 51.90% in (Rifa'i) area of infestation. No obvious differences were recorded in the incidence of (OWS) larvae among various study area of infestation except higher incidence of (OWS) larvae infestation in (Nasiriya) area was infested higher than other areas up to 56.14%. may be due to the same climatic condition in areas of study with the same province, the high prevalence of infestation in Nasiriya because of the Wide area of province and Many livestock fields than (Rifa'i) and other areas with the same province. Small waterways and farms of Nasiriya city are a qualified environment to larvae proliferation. The strategy of animal housing by restrict animal with wire silk dike may lead to some damage to animals in addition that food and mouth disease (FMD) which cause injuries in mouth, feet and mammary gland with exciting of ticks parasite on animal with manage disease, all these reasons may pleasant natural causes to make parasite larvae proliferation with high incidence case separated to all provinces in Iraq when adult fly laid these egg at damaged skin which proliferate on body fluids of life tissue that make fly treated animal and human infestation.

Table 6 clarify highly significant P>0.05 variation was noticed in the incidence of (OWS) larvae among different study types of animals with higher prevalence of (OWS) larvae infestation in Sheep and Goats types were infested higher than Cattle up to 57.43% and 44.44% respectively.

A comparative study between the 3 host species to explain study results regarding the opulence of infestations and host preferences, making under consideration several factors like climate conditions and farming systems. It has been indicated that length, humidity and shearing of fleece are very critical in explaining the high infestation in sheep. Therefore, long and high humidity of fleece predispose in concerning to such factors may make a case for this parasite’s evidently low preference for cattle because, compared to sheep, goats have a generally shorter, harsher, drier and less oily fleece, which is less inclined to dirtying and resulting microorganism contamination. What's more, many breeds of goat were not monotonal sheared and so prevent shearing wounds. This study is couldn't help contradicting [22] they found that species differences were not significantly $p = 0.3$ different with sheep and goats where, more than 990 sheep and 180 goats were examined, 129 and 18 were infected with screwworm indicating incidence rates of 13.0% and 10.0% for sheep and goats respectively. Nevertheless, concurred with them about high infestation in sheep contrasted with goats.

5. Conclusion

Sheep symbolize the foremost susceptible ruminants to the infestation, were attituded by seasonal fleecing that resulted in injuries on the skin of the affected animals due to an absence of practice fleecing methods, as a result of plurality of the mowing strategy in the investigated targeted areas allotted by educators and may result in wounds planned Indifference, divagation of liability to sanitize and clean the wounds, which gives the good an opportunity to the incidence of the disease

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