**Middle East Research Journal of Microbiology and Biotechnology**
ISSN: **2789-8644 (Print & Open Access)**
Frequency: Bi-Monthly
DOI: https://doi.org/10.36348/merjmb.2026.v06i02.003

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# Morphological Detection of *Chrysomya* Species in Sheep and Goats in Al Muthanna Province, Iraq

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**Abstract:** Myiasis is the infestation of live vertebrates with dipterous larvae that feed on the host's alive or dead tissue. The morphological study of the larvae of the genus Chrysomya spp., which cause myiasis, is a crucial step in reducing economic losses in livestock in Al-Muthanna Governorate. The methodology involves collecting live larvae and fixing them in warm water followed by 70% ethanol to preserve their morphological structure. This allows for microscopic examination, relying on respiratory openings and body projections as key taxonomic markers. This investigation has resulted in the documentation of three species for the first time in the governorate. The Old World screwworm (Ch. bezziana) emerged as the primary causative agent, characterized by clusters of circular spines and finger-like anterior respiratory openings with 4-6 branches. The second species (Ch. megacephala) was identified by a distance between the ends of the posterior respiratory ring equivalent to 1/3 to 1/5 of the radius. The third species (Ch. albiceps) was distinguished by prominent fleshy projections on the sides and back of the body. These results confirm the continued presence of the dangerous species Ch. bezziana in the region, which calls for the adoption of phenotypic examination for rapid field diagnosis, with the need to move in the future towards genetic analysis and phylogenetic tree analysis (Molecular barcoding and phylogenetic analysis) to investigate genetic diversity and pesticide resistance.

**Keywords:** Chrysomya spp., Sheep, Goats, Morphological Detection, Al-Muthanna Province, Iraq.

**Research Paper**

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**How to cite this paper:**
Zeina Qasim Fahmi & Akeel Mohammad Kadim Al-Musawi; "Morphological Detection of *Chrysomya* Species in Sheep and Goats in Al Muthanna Province, Iraq" Middle East Res J. Microbiol Biotechnol., 2026 May-Jun 6(2): 76-79.

**Article History:**
| Submit: 19.04.2026 |
| Accepted: 22.05.2026 |
| Published: 25.05.2026 |



## INTRODUCTION

Myiasis is an infestation of the tissues and organs of vertebrates (humans and animals) with the larvae of dipteran flies that feed on living, necrotic or dead tissue for some duration of life [1]. The term myiasis was coined by Hope in 1840, and defines exactly the ailment in man and animals produced by dipterous larvae, and distinguishes it from diseases owing to larvae of other insects [2]. Flies are usually attracted to open wounds and areas of the body contaminated with urine or faces [3]. One egg mass can produce many flies that can lay thousands more eggs and larvae thus modest infestations can rapidly turn into lethal epidemics [4]. The main fly families involved in myiasis are Sarcophagidae, Calliphoridae, Oestri Dae, Gasterophilidae and Hypodermatidae although other families such as Phoridae and Muscidae may also contribute to the disease [5]. Biologically, myiasis can be categorized according to the host-parasite relationship into obligatory myiasis and facul tive myiasis that feed on the live tissues of the host [1-6]. Myiasis is further categorized into several varieties depending on site of infection and location of the larvae within the human and animal body which include cutaneous, subcutaneous, nasal-pharyngeal, intestinal, internal, urinary and genital myiasis [7]. Myiasis is considered a neglected tropical disease (NTD) in tropical regions of the world, especially in low-income nations [8, 9]. The disease is also common in domestic animals like goats, sheep and cattle. The incidence of this disease in human has been reported to be less than that in animal [10]. Human myiasis is related to the increase of the population of flies, poor hygienic conditions and presence of domestic animals near to human habitation. The low level of public awareness is an essential role in the incidence of the condition, as the public is generally poorly informed about the disease and its causes [11]. The basic way to identify and diagnose

*Ch. bezziana* is mainly via keys based on the distinguishing features of the species [12].

# MATERIAL AND METHOD

**Samples Collection**

Positive cases were picked from different sections of sheep's and goat's bodies by utilizing forceps to remove and extract myiasis larvae. The larvae recovered were put into tubes filled with warm water for around 30 seconds to stop them from deteriorating and to keep their original color. The larvae were then covered with 70% ethanol and sent to the Veterinary College lab for microscopic analysis. This method preserves morphology best.

**Microscopically Results**

For each variation, measurements of the form and length of the larvae were taken using a dissecting microscope, to detect and diagnose the distinctive traits.

**Morphology and Characteristic Features under Dissecting Microscope**

**Morphology and Characters of *Ch. Bezziana***

Chrysomya bezziana, the elderly screwworm Villeneuve belongs to the family Calliphoridae, a major myiasis agent, with broad, circumferential bands of spines which penetrate the host tissue deeply and seem as screw threads when viewed head-down. It is hence frequently dubbed a screwworm. The main characteristic used in this study to identify OWS is the shape of posterior spiracles, which is characteristic of the Calliphoridae family, genus Chrysomya, and characterised by the incomplete closure of the thickening ring (peritreme) surrounding three spiral slits orientated toward the open portion of the peritreme (Fig. 1). Larvae with distinct rings of spines on segments II-X. The terminal segment bears posterior spiracles, surrounded by an incomplete black ring, the peritreme, with three straight slits directed toward the opening in the peritreme. The second distinctive and distinguishing feature of *Ch. bezziana* was the anterior spiracles and their hand-like shape with 4-6 branches (Fig. 2).

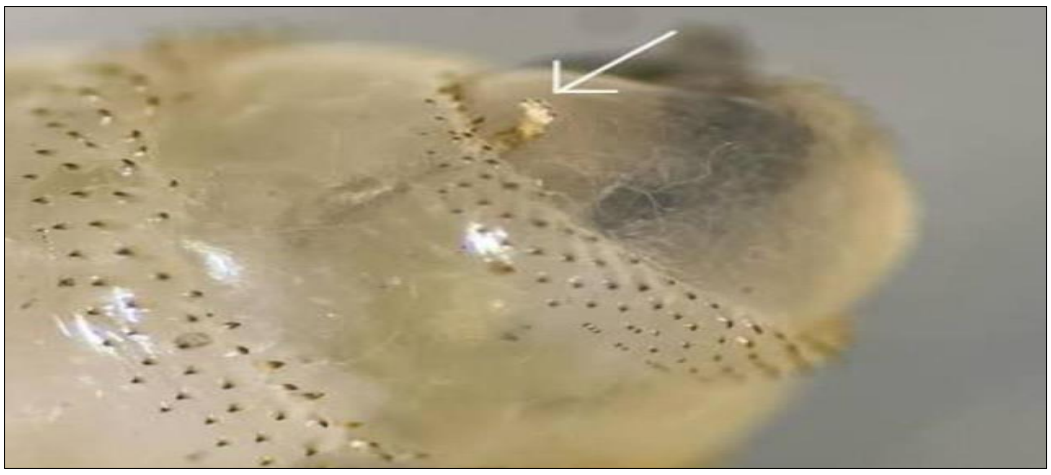

**Figure 1: Under a dissecting microscope, the posterior spiracles of *Ch. bezziana* exhibit incomplete closure of the peritreme ring encircling the three spiracle slits**

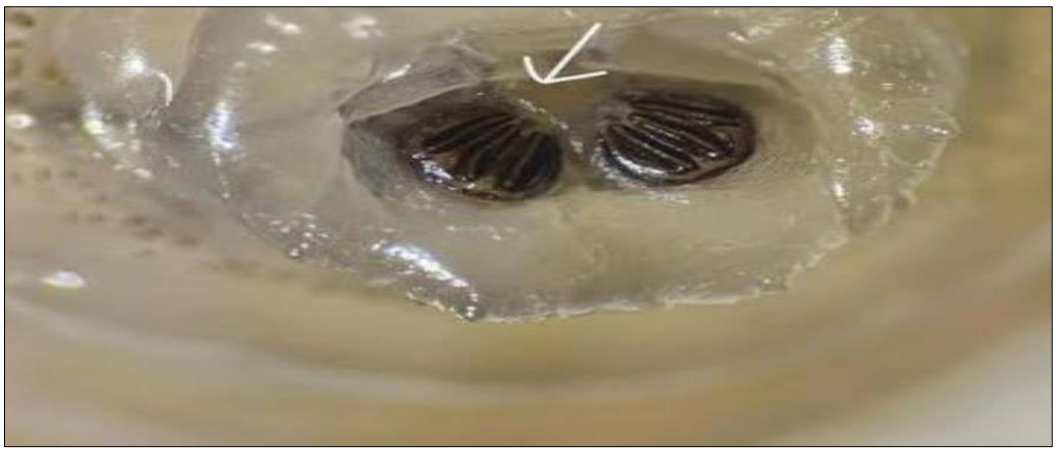

**Figure 2: Under a dissecting microscope, the anterior spiracles of *Ch. bezziana* exhibit projections that resemble fingers**

**Morphology and Characters of *Ch. Megacephala***

The Ch. megacephala would have the same posterior spiracles as Ch. bezziana as long as it belongs to the same genus as Chrysomya.One thing that differentiates it from Chrysomya is the space between its ends.The peritreme are moving apart in about 1/3 or 1/5 of the radius of one end (Fig. 3) however it is not always evident under a microscope.

**Figure 3: Under a dissecting microscope, the posterior spiracles of *Ch. megacephala* reveal that the distance between the peritreme's ends is decreasing by roughly 1 to 3 or 1 to 5 times the radius of one end**

**Morphology and Characters of *Ch. Albiceps***

The posterior spiracles of the larvae of Ch. albiceps are recognisable, comparable to those of the Calliphoridae family, and have two plates and three spiracle slits, encircled by a thickening with a closed peritreme ring (4.5. The larvae of Ch. albiceps are characterised by the presence of fleshy extensions on the sides and back of the body (Fig. 4).

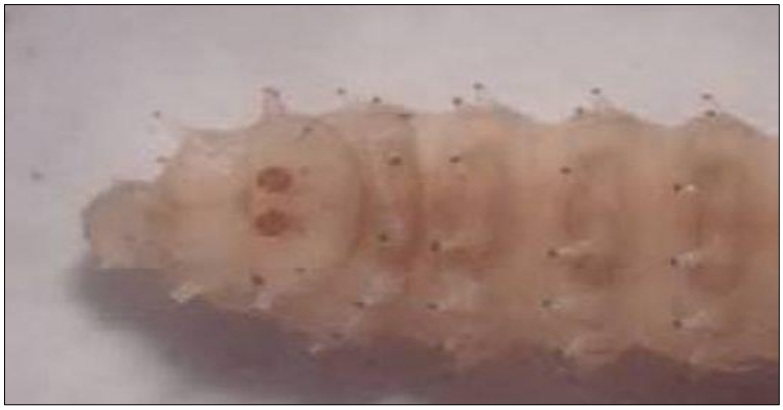

**Figure 4: *Calliphoridae* family posterior spiracles (*Chrysomya albiceps*) viewed under a dissecting microscope**

## DISCUSSION

Morphological investigation in Al-Muthanna Province indicated complex aetiology of myiasis including three different species of the genus Chrysomya, C. bezziana, C. megacephala and C. albiceps. Their identification by certain diagnostic larval characteristics proved the participation of each species in animal infestations in the area. This is the first report describing the diversity of Chrysomya species in the province of Al-Muthanna. The main agent, C. bezziana: Identification of C. bezziana (Old World Screwworm) is the most essential finding as it is necessary. Our samples contained distinct “hand-like” anterior spiracles and thorn-like single-pointed spines. These findings are in agreement with Al-Diwaniyah province [13], which has a similar climate and borders Al-Muthanna in southern Iraq. The Second infestation (*C. megacephala & C. albiceps)* these two species were detected with the prime agent and are usually associated with facultative myiasis. It is crucial that these species co-exist, particularly the carnivorous *C. albiceps* larvae. Species diversity and livestockOur observations on the species diversity results are comparable with those from Baghdad [14]. The similarities of the dipterous fauna producing myiasis in the two regions could be due to the same environmental and climatic circumstances that favour the breeding and distribution of these flies. Regional and Economic Impact: The livestock business is under a lot of environmental stress. The variety of *Chrysomya* species discovered in Al-Muthanna is a good indication

of this. The larvae inflict great harm in the tissue and financial losses, as reported from Al-Diwaniyah [13]. This observation aligns with [15], findings in his studies on myiasis flies, where he demonstrated that the larvae of *Chrysomya bezziana* are characterized by an incomplete peritreme surrounding the posterior respiratory slits, a feature that distinguishes them from some other species of Caliphoridae flies. The [16], also confirmed that the shape of the posterior respiratory openings and the number of respiratory slits are accurate diagnostic tools for differentiating between myiasis fly species.

## CONCLUSION

Research has shown that myiasis in Al-Muthanna province shows a complex biodiversity, with the first-ever detection of three species of the genus *Chrysomya*. The obligate and highly pathogenic species, *Ch. bezziana*, which causes deep tissue necrosis and significant economic losses in livestock, remains dominant. The study recommends using respiratory lesion and body projection characteristics as a standard tool for rapid field diagnosis. It also emphasizes the need for future molecular genetic analysis and pedigree studies to investigate genetic diversity and pesticide resistance patterns in the region.

**Data Availability Statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Conflict of Interest Statement**: The author declares that he has no conflicts of interest, financial or otherwise.

**Funding Sources:** The author extends his appreciation to the Department of Parasitology, College Veterinary Medicine

**Financial Disclosure:** The authors declared that this study did not receive any financial support.

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