



First Photographic Record of the Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854) (Hemiptera: Heteroptera: Belostomatidae) from the Gaza Strip, Palestine

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ABSTRACT

The Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854) is a large predatory aquatic heteropteran distributed from southeastern Europe and the eastern Mediterranean through the Middle East to southern Asia. This short communication presents, to the best of our knowledge, the first photographic record attributable to this species from the Gaza Strip, Palestine. A single living but weakly moving adult was carried by sea waves onto the Mediterranean shore near Al-Mawasi ecosystem, Khan Younis Governorate, southern Gaza Strip, on July 23, 2026. The specimen was picked up with a small piece of cloth by Eng. Abdulla Al-Najjar, taken to his home, and died approximately 5–10 minutes later. Although the available photographs and video were insufficient for definitive sex determination, the specimen was most likely a female. Based on its proportions relative to the hand holding it, the specimen was visually estimated to measure approximately 70–80 mm in body length, 25–30 mm in maximum width, and 10–15 mm in dorsoventral thickness. It was photographed and recorded in a short video but was not preserved. Identification was based on visible external morphological characteristics and comparison with published descriptions and images; therefore, the record requires confirmation through future voucher-based morphological or molecular examination. The specimen may have dispersed from a freshwater habitat within the Gaza Strip, such as Wadi Gaza, the Al-Mawasi coastal ecosystem and its historically occurring Thamilas, an agricultural or irrigation pond, a drainage channel, a wastewater-treatment lagoon, or a temporary stagnant-water pool. Some of these aquatic habitats have formed or expanded following extensive wartime damage to sewage and drainage infrastructure. Alternatively, the individual may have reached the coast through long-distance flight, accidental transport, passive displacement, or movement by seawater and wave action. Severe insecurity, mass displacement, restricted movement, and widespread environmental destruction prevented systematic searches for additional individuals. Accordingly, this isolated observation provides no evidence of an established or locally breeding population. Nevertheless, it demonstrates the value of photographic and video documentation for recording rare species in regions where conventional biodiversity surveys are severely constrained.

Keywords: Giant Water Bug; *Lethocerus patruelis*; Belostomatidae; aquatic Heteroptera; citizen science; first record; freshwater habitats; coastal wetlands; Wadi Gaza; Al-Mawasi ecosystem; Gaza Strip; Palestine.

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1. INTRODUCTION

Giant Water Bugs (Belostomatidae) are predatory aquatic insects inhabiting ponds, marshes, streams, irrigation canals, reservoirs, and temporary water bodies [1]. Members of the Giant Water Bug group rank among the largest aquatic insects worldwide. Their broad, dorsoventrally flattened bodies, concealed antennae, powerful raptorial forelegs, natatorial hind legs, and paired posterior respiratory appendages are adaptations for an aquatic, ambush-predatory mode of life [2] [3].

The principal Mediterranean representative is the Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854). Its geographical range extends from southeastern Europe and the Balkans through Anatolia, the Caucasus,

the eastern Mediterranean, and the Middle East to southern Asia. Published records include Croatia, Bulgaria, Greece, Italy, Cyprus, Türkiye, and the Caucasus [4]–[8]. A second species, the predominantly African Giant Water Bug (*Lethocerus cordofanus* Mayr, 1853), reaches the eastern Mediterranean through the Nile basin and has been documented in Egypt and Israel [8] [9]. Recent records, particularly from Italy and Mediterranean islands, have renewed interest in the distributional dynamics of the Indo–East Mediterranean Giant Water Bug. Natural dispersal, climate-related changes in habitat suitability, accidental transport, and historical under-recording have been proposed as possible explanations for newly detected occurrences [10]–[14].

Castiglione et al. [11], for example, reported the first records attributable to the Indo–East Mediterranean Giant Water Bug from Calabria, southern Italy, based on two individuals, including a photographed but uncollected specimen and a dead, damaged female. Their study demonstrated both the potential contribution and the taxonomic limitations of photographic records. The authors also emphasized that isolated adult observations do not necessarily demonstrate the presence of an established breeding population.

The Aquatic True Bugs of the Gaza Strip remain poorly documented, and no published record of the Indo–East Mediterranean Giant Water Bug from this territory was located. The Gaza Strip nevertheless contains several natural and artificial aquatic environments that could potentially support aquatic insects, including Wadi Gaza, agricultural ponds, irrigation reservoirs, drainage channels, wastewater-treatment lagoons, and seasonal pools. The Al-Mawasi coastal ecosystem in the southwestern Gaza Strip has also historically contained scattered wetlands and locally recognized *Thamilas*—waterlogged depressions formed where the shallow groundwater table approaches or reaches the land surface. Although these habitats have become increasingly rare, their standing freshwater and moist margins can support aquatic insects, amphibians, and other wetland-associated fauna. Previous ecological studies documented considerable diversity of birds, mammals, reptiles, and amphibians in the Al-Mawasi ecosystem, including species associated with wet and aquatic habitats [15] [16]. Furthermore, the extensive destruction of water, sewage, and drainage infrastructure during the Israeli war of genocide and ethnic cleansing (2023–2026), which began on October 7, 2023, has created or enlarged numerous stagnant-water bodies.

This short communication documents an Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854) photographed in Khan Younis Governorate and discusses the biogeographical significance, limitations, possible habitat origins, and public-science value of the observation. It also identifies priorities for confirming the species and determining whether it occurs as a resident breeding population in the Gaza Strip.

2. MATERIALS AND METHODS

2.1. Observation record

A single adult Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854) was encountered by 38-year-old Eng. Abdulla Al-Najjar on the Mediterranean shore near Al-Mawasi ecosystem, Khan Younis Governorate, southern Gaza Strip, on July 23, 2026. According to Al-Najjar, sea waves carried the insect onto the shore while it was still alive but weakly moving. He picked it up using a small piece of cloth and subsequently took it to his home, where it died approximately 5–10 minutes later. Al-Najjar and his colleagues stated that they had never previously encountered an insect of this kind. Based on its proportions relative to the hand holding it, the specimen was visually estimated to measure approximately 70–80 mm in body length from the anterior end of the head to the posterior end of the abdomen, 25–30 mm in maximum width, and 10–15 mm in dorsoventral thickness. Al-Najjar recorded a short video of the specimen and posted it on Facebook on July 24, 2026, seeking assistance with its identification. In the video, he stated: “We found this strange creature on the seashore in Gaza. We do not know exactly what it is—whether it is a fish, an insect, or some other kind of creature.

It has a very unusual shape, and we have never seen anything like it before. If anyone recognizes it or knows its name, please tell us what it is” (Figure 1). The photographs extracted from the short video showed both dorsal and ventral views of the specimen (Figure 2). No precise geographical coordinates, detailed habitat description, or information regarding nearby artificial lighting was recorded. The specimen was not retained as a voucher, and the subsequent fate of its remains is unknown. Although the available photographs and video were not sufficiently clear for definitive sex determination, the specimen was most likely a female. Because no scale bar or object of precisely known dimensions was included in the images, the reported measurements should be regarded as visual estimates rather than exact morphometric measurements.



Figure 1: Screenshot from the short video posted on Facebook by Eng. Abdulla Al-Najjar, requesting assistance from the online community in identifying the unusual organism encountered alive but weakly moving on the Mediterranean shore near Al-Mawasi, Khan Younis Governorate, Gaza Strip, on July 23, 2026



Figure 2: Screenshot from a short video showing the Indo–East Mediterranean Giant Water Bug encountered alive but weakly moving on the Mediterranean shore near Al-Mawasi, Khan Younis Governorate, Gaza Strip, Palestine, on July 23, 2026: (A) dorsal view and (B) ventral view

2.2. Photographic identification

The photographs and video were examined for visible external morphological characteristics and compared with published descriptions and images of regional Belostomatidae [9] [17]–[19]. Assignment to Belostomatidae was supported by the specimen's large, broad, dorsoventrally flattened body; short and largely concealed antennae; powerful raptorial forelegs; broad natatorial hind legs; and paired posterior respiratory appendages. Its general habitus and estimated body length were consistent with the group of Giant Water Bugs, and its visible appearance most closely resembled the Indo–East Mediterranean Giant Water Bug. However, the specimen was unavailable for direct measurement, detailed examination, dissection, comparison with reference material, or DNA analysis. Some characters required to distinguish the Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854) conclusively from closely related regional taxa, particularly the African Giant Water Bug (*Lethocerus cordofanus* Mayr, 1853), could therefore not be assessed. The identification should consequently be regarded as photographic and provisional pending confirmation from a preserved specimen.

2.3. Limitations of field investigation

No systematic field survey for additional specimens could be undertaken. Fieldwork throughout the Gaza Strip, particularly in the densely populated and heavily affected western areas, was severely constrained by insecurity, mass displacement, overcrowding, restricted movement, and extensive environmental and infrastructural destruction during the Israeli war of genocide and ethnic cleansing that began in October 2023. Consequently, potentially suitable freshwater habitats could not be systematically visited or sampled. These included Wadi Gaza, the Al-Mawasi coastal ecosystem and its historically occurring *Thamilas*, agricultural and irrigation ponds, drainage channels, wastewater-treatment lagoons, and permanent or temporary stagnant-water pools. The absence of further documented individuals should therefore not be interpreted as evidence that the species is absent from other locations in the Gaza Strip.

3. RESULTS AND DISCUSSION

3.1. Significance of the record

The photographed specimen represents, to the best of our knowledge, the first documented photographic record attributable to the Indo–East Mediterranean Giant Water Bug (*Lethocerus patruelis* Stål, 1854) from the Gaza Strip, Palestine. Its occurrence is biogeographically plausible because the Gaza Strip lies on the southeastern Mediterranean coast within the wider regional distribution of Giant Water Bugs. Records from Rhodes, Cyprus, coastal Türkiye, several Aegean islands, and other countries demonstrate the occurrence of the Indo–East Mediterranean Giant Water Bug in geographically nearby or ecologically connected parts of the eastern Mediterranean [9] [17] [18] [21]–[22]. The Gaza Strip record therefore fills an apparent distributional gap along the southeastern Mediterranean coast.

Nevertheless, the record must be interpreted cautiously. The insect was encountered alive but weakly moving after being carried by sea waves onto a marine shore rather than observed in its original freshwater habitat. It died approximately 5–10 minutes after being picked up and taken to Al-Najjar's home, and no voucher specimen was preserved.

Although its sex could not be determined conclusively from the available photographs and video, the specimen was most likely a female and some diagnostically important morphological features could not be adequately assessed. In addition, no other individuals, whether alive or dead, were documented. This single observation supports the probable occurrence of the Indo–East Mediterranean Giant Water Bug in the Gaza Strip but provides no evidence of local reproduction, abundance, seasonality, or population establishment. Confirmation should be based on additional specimens accompanied by precise coordinates, habitat information, scale-based measurements, high-resolution dorsal and ventral photographs, and preferably preserved voucher material.

3.2. Interpretation of the coastal finding

The arrival of the living but weakly moving specimen on the Mediterranean shore does not indicate that the marine coast was its original habitat. Giant Water Bugs are freshwater insects, although adults are capable of flight and may disperse between water bodies, particularly when aquatic habitats deteriorate or dry. Adults are also strongly attracted to artificial lights, which can draw them away from their original aquatic habitats [11] [23]. According to Al-Najjar's direct account, sea waves carried the insect onto the shore near Al-Mawasi ecosystem, Khan Younis Governorate, while it was still alive but weakly moving. This observation indicates that wave action contributed directly to its final arrival on the beach, although it does not explain how the insect initially entered the marine water. The specimen may previously have flown from a nearby freshwater habitat, been washed into the sea by surface runoff or drainage, or undergone passive or accidental displacement. Accordingly, the recovery locality should be regarded as the site where the insect was carried ashore rather than necessarily its original source habitat.

3.3. Possible source habitats in the Gaza Strip

Several natural and artificial freshwater environments in the Gaza Strip warrant investigation as possible source habitats. Wadi Gaza, the territory's principal wetland ecosystem, is among its most important natural areas for wildlife. Local ecological studies have documented its seasonal pools, wastewater-influenced channels, vegetated margins, and diverse aquatic and semi-aquatic microhabitats [24] [25]. The proliferation of mosquitoes within this wetland confirms the presence of habitats capable of supporting aquatic insect life stages [25]. Dragonflies have also been observed around Wadi Gaza and other freshwater bodies in the Gaza Strip, further indicating the availability of suitable habitats for insects whose immature stages develop in water (Personal Observations). Such conditions could potentially support the Indo–East Mediterranean Giant Water Bug and its aquatic prey. However, no direct evidence currently links the recorded individual to Wadi Gaza.

The Al-Mawasi coastal ecosystem in the southwestern Gaza Strip should also be considered a potential source habitat. Historically, this ecosystem contained scattered wetlands and locally recognized "*Thamilas*"—waterlogged depressions formed where the shallow groundwater table approaches or reaches the land surface. Although these habitats have become increasingly rare, their standing freshwater and moist margins can support aquatic insects, amphibians, and other wetland-associated fauna.

Previous ecological studies documented considerable diversity of birds, mammals, reptiles, and amphibians in the Al-Mawasi ecosystem, including species associated with aquatic and wetland habitats [15] [16]. During the Israeli war of genocide and ethnic cleansing (2023–2026) and the resulting mass displacement, the Al-Mawasi ecosystem became one of the principal areas of concentration for displaced Palestinians. The accompanying proliferation of stagnant pools, wastewater accumulations, and flooded depressions may have created additional temporary habitats suitable for aquatic insects, potentially including the Indo–East Mediterranean Giant Water Bug. Nevertheless, targeted field surveys are required to determine whether the species occurs in these habitats.

Other potential source habitats include agricultural ponds, irrigation reservoirs, drainage channels, wastewater-treatment lagoons, and permanent or seasonal pools. Conditions associated with the Beit Lahia Wastewater Treatment Plant demonstrate the historical presence of extensive human-made wastewater habitats in the northern Gaza Strip [26]. Similar treatment lagoons, sewage-fed pools, and drainage systems elsewhere in the Gaza Strip may provide standing or slowly flowing water, marginal vegetation, and abundant aquatic prey. Some of these artificial water bodies could therefore function as temporary refuges, dispersal stopovers, or potential breeding habitats for large aquatic insects.

The Israeli war of genocide and ethnic cleansing in the Gaza Strip (2023–2026) has severely degraded environmental conditions through the widespread destruction of water, sewage, wastewater-treatment, and drainage infrastructure. This destruction has created or enlarged stagnant sewage pools, flooded depressions, marsh-like areas, and temporary water bodies across the territory. More broadly, infrastructural collapse, waste accumulation, ecological disruption, and mass displacement have altered wildlife habitats and increased human–animal interactions in displacement areas [27]. Where wastewater is diluted by rainfall, groundwater seepage, infrastructure leakage, or agricultural runoff, some newly formed water bodies may temporarily support aquatic insects. Conversely, severe organic, chemical, or microbial pollution, combined with low dissolved-oxygen concentrations, may inhibit the long-term survival and reproduction of sensitive aquatic organisms. Accordingly, the possible association of the Indo–East Mediterranean Giant Water Bug with Wadi Gaza, Al-Mawasi wetlands, wastewater-treatment lagoons, or war-created aquatic habitats represents a plausible and testable ecological hypothesis rather than a confirmed explanation for the present record.

3.4. Possible origin of the specimen

The geographical origin of the Indo–East Mediterranean Giant Water Bug remains uncertain. The precise recovery locality near Al-Mawasi, Khan Younis Governorate, gives particular relevance to the nearby Al-Mawasi coastal ecosystem as a potential source habitat. Its historically occurring *Thamilas*, agricultural ponds, and more recently formed stagnant or flooded depressions constitute plausible, although unconfirmed, habitats from which the recorded individual may have originated. Alternatively, it may have originated from Wadi Gaza or another freshwater habitat within the Gaza Strip and subsequently reached the coastal waters off Khan Younis. Nevertheless, no direct ecological connection between the recorded specimen and any particular freshwater habitat has been established.

Furthermore, the destruction of water, sewage, wastewater-treatment, and drainage infrastructure during the Israeli war of genocide and ethnic cleansing (2023–2026) has created or enlarged stagnant pools, flooded depressions, marsh-like areas, and other temporary water bodies, while potentially altering wildlife habitats and dispersal patterns [27]. Alternatively, the individual may have reached the coastal waters through long-distance flight, passive displacement, accidental transport, surface runoff, or drainage before being carried alive but in a weakened condition onto the shore by sea waves. Because the insect was carried ashore alive but weakly moving, and no direct ecological connection to a particular inland water body was documented, the available evidence cannot determine its original habitat or distinguish among these possible pathways. Although recent records from Italy and Mediterranean islands have sometimes been interpreted as indications of westward range expansion or accidental introduction, a single isolated record should not automatically be regarded as evidence of recent range expansion [10]–[12] [14].

Historical under-sampling is particularly relevant in the Gaza Strip, where aquatic insects have received little systematic investigation. The recorded individual may therefore represent a rare or previously overlooked component of the local fauna rather than a recent arrival. Conversely, the possibility that it was a transient individual originating outside the Gaza Strip cannot be excluded. Repeated accidental introductions cannot currently be proposed because only one individual has been documented and no potential transport pathway has been identified. Determining the species' geographical origin and population status will require additional records; standardized surveys of Wadi Gaza, the Al-Mawasi *Thamilas*, agricultural ponds, wastewater-treatment lagoons, drainage channels, and war-created water bodies; and examination of historical photographs, local and museum collections, and unpublished observations.

3.5. Evidence for establishment and reproduction

No additional individuals, nymphs, eggs, exuviae, mating adults, or repeated occurrences were documented. Therefore, the present observation provides no evidence that the Indo–East Mediterranean Giant Water Bug has established a locally breeding population in the Gaza Strip. However, the absence of further records should be interpreted cautiously because insecurity, movement restrictions, mass displacement, overcrowding, and widespread destruction prevented systematic surveys of potentially suitable freshwater habitats. Under these conditions, failure to detect additional specimens cannot be regarded as evidence of genuine absence. Confirmation of local establishment would require repeated observations over time and, preferably, the documentation of adults of both sexes, nymphs, eggs, or other developmental stages within suitable freshwater habitats. Such evidence would provide substantially stronger support for local reproduction than additional isolated adults recovered on land or along the coast.

3.6. Ecological and public relevance

The Indo–East Mediterranean Giant Water Bug is a large aquatic predator that feeds on aquatic insects and other invertebrates, tadpoles, amphibians, and occasionally small fish. Direct predation on the Balkan Frog has been documented [28].

If an established population occurs in the Gaza Strip, the species may occupy an important predatory position in freshwater food webs. However, its ecological role and potential effects on native aquatic communities cannot be inferred from a single documented individual. Giant Water Bugs are not considered important vectors of human disease. Nevertheless, their powerful raptorial forelegs and piercing-sucking mouthparts can inflict a painful defensive bite when the insects are handled or disturbed. Future specimens should therefore be collected using forceps, an aquatic net, or protective gloves and placed in a secure container. This defensive behavior should not be interpreted as routine aggression toward humans.

3.7. Value of photographic documentation and citizen science

The present observation demonstrates that photographs and short videos shared by residents can provide valuable preliminary evidence of rare or previously unrecorded species. The additional eyewitness information provided by Al-Najjar—including the specimen's arrival with the sea waves, its weakened but living condition, the method used to pick it up, and its death shortly afterward—also demonstrates the importance of recording detailed firsthand observations alongside photographic evidence. Such documentation is particularly important in regions where insecurity, restricted access, and infrastructural destruction prevent conventional biodiversity surveys. Citizen observations and online records have contributed to the detection of the Indo-East Mediterranean Giant Water Bug in Cyprus and to the documentation of its changing distribution in Italy [18] [23]. In the Gaza Strip, photographs and videos submitted by residents, farmers, researchers, and wildlife enthusiasts may similarly provide important preliminary distributional data. Nevertheless, photographic identifications should be treated cautiously when specimens are unavailable for direct morphological or molecular examination. Future observations should, whenever safely possible, include the date, precise geographical coordinates, habitat description, scale-based measurements, high-resolution dorsal and ventral photographs, information concerning nearby water bodies and artificial lighting, and preservation of a voucher specimen.

3.8. Research priorities

Targeted surveys should be conducted in Wadi Gaza, agricultural and irrigation ponds, wastewater-treatment facilities, drainage channels, sewage-fed pools, and other permanent or temporary water bodies. Sampling should document water quality, hydroperiod, aquatic and marginal vegetation, prey availability, degree of pollution, and proximity to artificial lighting. Repeated observations and the detection of nymphs or eggs would provide stronger evidence of local breeding than additional isolated adults. Voucher specimens should be examined using appropriate taxonomic keys and compared with regional reference material. DNA barcoding could provide complementary confirmation when laboratory facilities become available, as demonstrated for a specimen collected in southern Italy [19].

Future research should also review unpublished photographs, social-media posts, museum specimens, educational collections, and local natural-history records. These sources could help determine whether the photographed individual represents a recent arrival or a previously overlooked component of the Gaza Strip fauna.

New Mediterranean occurrences should not automatically be attributed to climate change or recent geographical expansion. Recent modelling has documented changing range dynamics of the Indo-East Mediterranean Giant Water Bug in Europe [14], while climatic warming may more broadly alter wetland suitability and aquatic-insect distributions [29]. For the Gaza Strip, however, historical under-recording remains at least as plausible as recent colonization.

4. CONCLUSION

This photographic observation provides the first documented evidence attributable to the Indo-East Mediterranean Giant Water Bug in the Gaza Strip, Palestine. A single living but weakly moving adult, most likely a female although its sex could not be definitively determined, was carried by sea waves onto the Mediterranean shore near Al-Mawasi, Khan Younis Governorate, on July 23, 2026. It was picked up with a small piece of cloth by Eng. Abdulla Al-Najjar, taken to his home, and died approximately 5–10 minutes later. The coastal finding may reflect dispersal from the nearby Al-Mawasi coastal ecosystem—including its historically occurring *Thamilas*, agricultural ponds, and more recently formed stagnant or flooded depressions—or from Wadi Gaza or another natural or artificial freshwater habitat within the Gaza Strip. However, long-distance flight, accidental transport, passive displacement, surface runoff, and movement through coastal waters cannot be excluded. Severe insecurity, mass displacement, restricted movement, and extensive environmental destruction prevented systematic searches of potentially suitable habitats. Consequently, this isolated observation neither demonstrates a resident breeding population nor establishes the specimen's geographical origin. Because the specimen was not preserved, its photographic identification remains provisional and requires confirmation through future voucher-based morphological or molecular examination. Nevertheless, the record fills an apparent distributional gap along the southeastern Mediterranean coast and highlights the value of photographic, video, and eyewitness documentation for detecting rare species where formal biodiversity monitoring is severely constrained.

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