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On the occurrence, trapping and potential risks of the invasive Indian Myna (*Acridotheres tristis* Linnaeus, 1766) in the Gaza Strip: Palestine

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Abstract
The coastal Gaza Strip, which has an area of 365 km^2; equivalent to about 1.5% of the area of Palestine (27,000 km^2), is home to a relatively large diversity of bird species, including the invasive Indian Myna (*Acridotheres tristis* Linnaeus, 1766). The present study aims to address the occurrence, risks and some other ecological aspects of the Indian Myna in the Gaza Strip. This 10-year descriptive and cumulative study from 2013 to 2022 was based on field visits, direct observations, frequent meetings and discussions with stakeholders, follow-up of news and social media, as well as photography for documentary and confirmatory purposes. The results of the current study showed that the emergence of Indian Myna in the Gaza Strip began in 2006, and after 2008, its numbers increased remarkably and significantly. The bird arose in Palestine as a result of cage escapees from zoos or deliberate releases. Indian Mynas are usually abundant throughout the year in urban areas and the outskirts of the Gaza Strip, where feeding sites are available. The main habitats of Indian Minas include urban parks, gardens, agricultural orchards, and other similar environments. Potential local risks of the Indian Myna included its threats to local biodiversity, damage to domestic life and agricultural crops, as well as potential disturbance, noise and disease transmission to Gazans. Nets and sticks coated with glue were the main methods used by Gazans to capture Indian Mynas. The Indian Myna is locally sold at cheap prices of 2-3 USD per pair. A few Gazans claimed to eat the bird. It appears that the Indian Myna poses little threat in the Gaza Strip, and therefore there are no clear methods adopted by the responsible authorities to control the bird. Finally, the study recommends appropriate management strategies to stop or reduce the spread of non-native biota in the Gaza Strip when their numbers increase alarmingly and their risks increase to an intolerable extent.

Keywords: Indian Myna, *Acridotheres tristis*, occurrence, trapping, risks, invasive species, biodiversity, and Gaza Strip

1. Introduction
Palestine (27,000 km^2) is home to nearly 550 bird species inhabiting or visiting most of the country's ecosystems and habitats [1]. In spite of its very small area which represents about 1.5% of the whole Palestine, the Gaza Strip (365 km^2) witnesses a relatively great diversity of resident and migratory bird species; some of which have been mentioned in some local studies [2-9]. During the last two decades, two invasive bird species have spread in the Gaza Strip. They are the Rose-ringed Parakeet or Ring-necked Parakeet (*Psittacula krameri*) and the Indian Myna or Common Mynah (*Acridotheres tristis*). The latter, which is locally known as "*Yassmina*" or "*Maya*", is a passerine bird belonging to the family Sturnidae and native to Asia as its common name indicates [10]. It invaded Palestine after escape from captivity or deliberate release into the wild from its first introduction in 1997 in Tel Aviv as indicated by Holzapfel *et al*. [11]. They have adapted very well to live and reproduce in both rural and urban environments of Palestine and hence the Gaza Strip. Globally, it has been declared one of the world's most invasive species and one of only three birds listed among the "100 Worst Invasive Species in the World" that pose a threat to biodiversity, agriculture, and human interests [12].

Despite the extensive work related to the Indian Myna at the global levels, the regional and local studies that dealt with the bird remain in need of development and intensification, especially since the Indian Myna is an invasive bird for most of the countries of the Middle East region. Most of the studies that dealt with the Indian Myna in the region were the part of Israel [11, 13, 14-21] and Jordan [22-25], while the contributions of the rest of the countries seemed to be less [26-36].

Fig 1: Indian Myna (*Acridotheres tristis*) [Photo: Bashar S. Jarayseh]

Studies related to Indian Mynas (Figures 1 and 2) in Palestine seem limited and not in-depth in their arguments. In the Gaza Strip, Abd Rabou [5] encountered dozens of Indian Myna among the birds thriving on the main campus of the Islamic University of Gaza. He pointed out that dozens of Indian Mynas and Hooded Crows (*Corvus corone*) were commonly seen wandering in the green grassy court of the Islamic University of Gaza. Abd Rabou [6] recorded the Indian Myna in the Al-Mawasi ecosystem, which is located adjacent to the Mediterranean Sea in the far southwest of the Gaza Strip. This ecosystem is considered the food basket for the residents of the Gaza Strip. The residents of Al-Mawasi complained of the attacks of the Indian Myna to their agricultural crops, especially the guava fruits which flourish in the area. Abd Rabou [37] indicated that the Indian Myna was the only exotic or alien bird that was stuffed in the biology exhibition of the Islamic University of Gaza, which was bombed and completely destroyed by the Israeli army during the first Israeli War on the Gaza Strip in December 2008. More recently, Al-Sweirki [9] reported huge numbers of the Indian Myna traded at pet shops of the Gaza City.

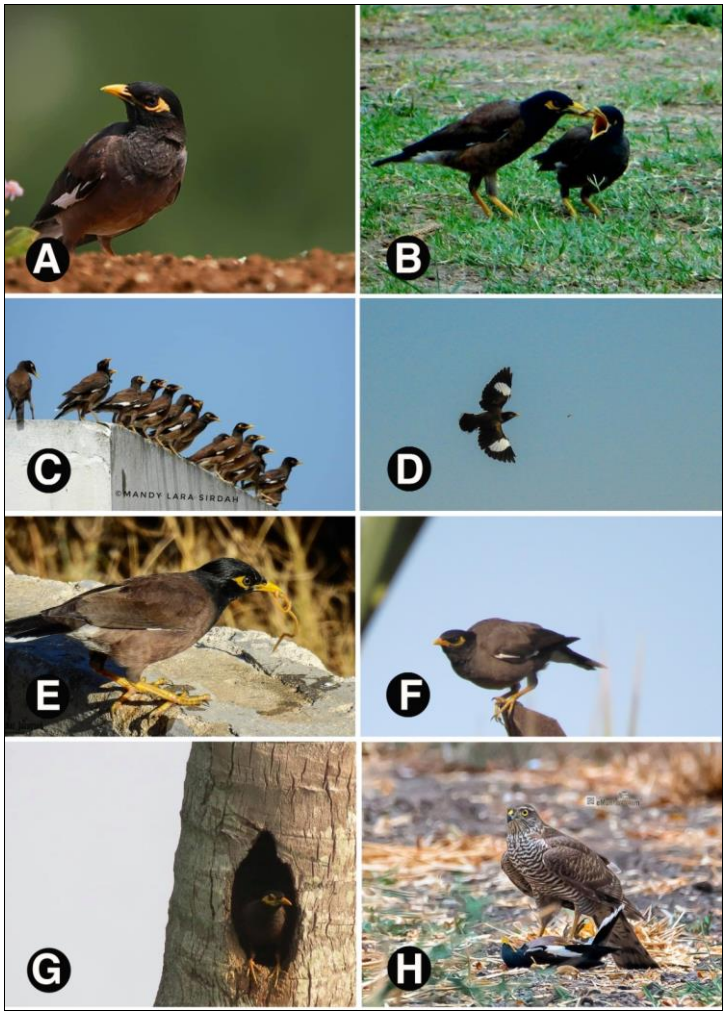

Fig 2: The Indian Myna (*Acridotheres tristis*) in the Palestine environment: (A) A single Myna stand on a wall, (B) A pair of Myna search for food in a grassy area, (C) Roosting Mynas, (D) A flying Myna, (E) A bird while picking an invertebrate, (F) A Myna preparing to fly, (G) A Myna in a cavity nest, and (H) The Myna in the grip of the Eurasian Sparrowhawk (*Accipiter nisus*)

In the West Bank, Handal and Qumsiyeh [38] revealed that the distribution of the exotic Indian Myna is almost entirely restricted to the areas of human habitation, and that the populations of birds have spread from the western coast of Palestine to the Jerusalem (Al-Quds) area and then to the rest of the West Bank, reaching the Jordan Valley and then to Jordan. Handal *et al*. [39] reported great numbers of the Indian Myna among the illegally traded wild animals in the West Bank as well. Khadraj [40] wrote on Indian Mynas as exotic and dangerous species in Palestine. Based on the scarcity of studies targeting this invasive bird in Palestine, the current study aimed to address the occurrence and risks of Indian Myna (*Acridotheres tristis* Linnaeus, 1766) in the Gaza Strip. The importance of this study lies in the fact that it is the first

of its kind that deals with the ecology of this invasive bird in some detail.

2. Materials and Methods

2.1 Gaza Strip

The Gaza Strip (365 km^2) is an arid to semi-arid coastal area located in the southern part of the Palestinian coast along the eastern shore of the Mediterranean Sea (Figure 3). It is composed of five governorates: North Gaza, Gaza, Middle, Khan Yunis, and Rafah. The local average rainfall is 300 mm. Sand dunes are the main feature of the western part of the Gaza Strip, while silt and clay lands predominate in the eastern part. The population of the Gaza Strip is estimated to be more than 2.35 million people, and the population density reaches more than 6,000 people per square kilometer, making the Gaza Strip one of the most densely populated areas in the world. Many Gazans are interested in wildlife hunting; especially birds throughout the Gaza Strip. Bird trapping is more concentrated near the northern and eastern borders. Hunters have been setting up hunting equipment, especially nets, in the area to hunt wild birds, including the Indian or Common Myna, which invaded Palestine since approximately two decades.

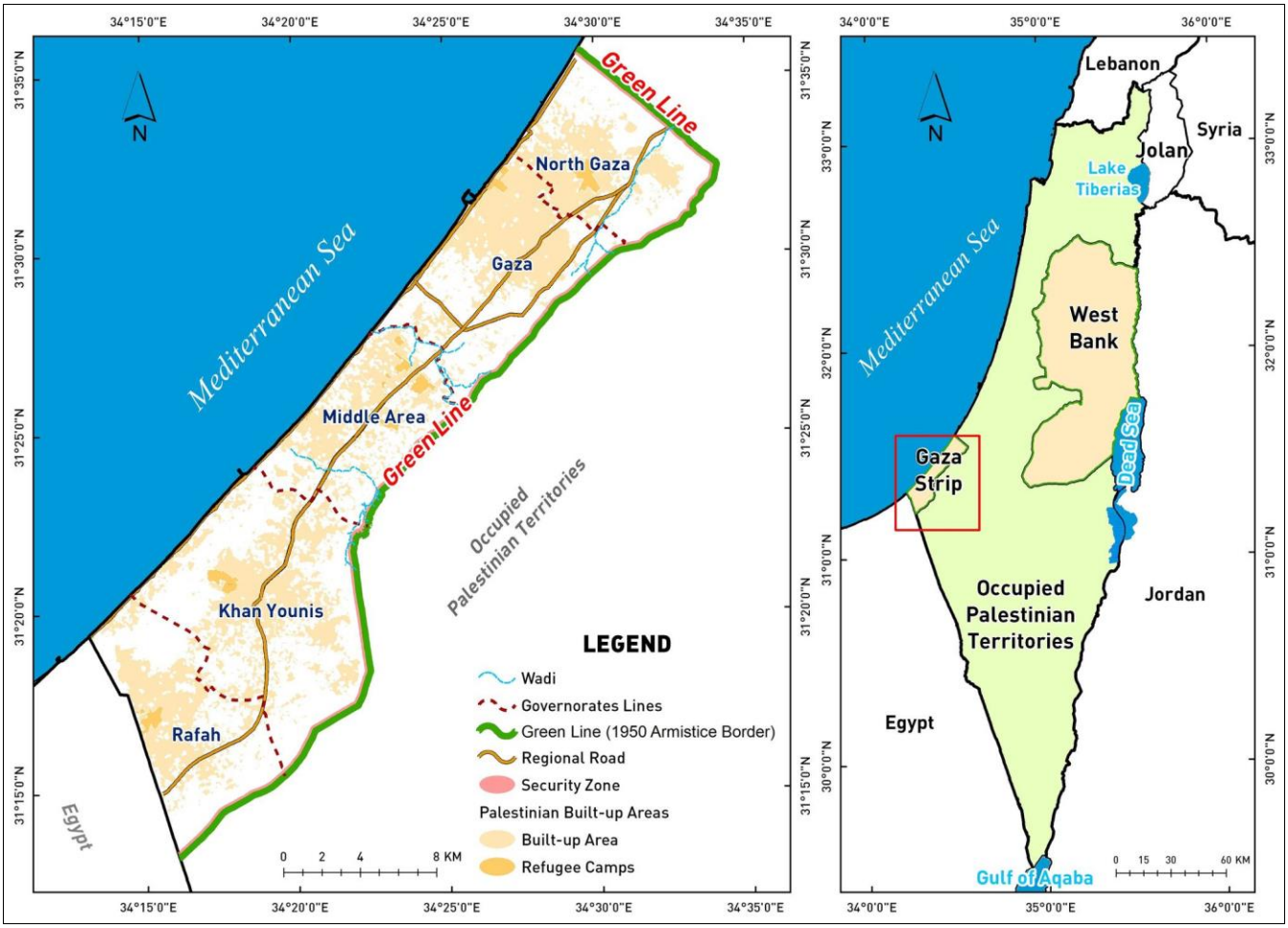

Fig 3: Map of the Gaza Strip – Palestine

2.2 Procedure

Since September 2013, multiple field visits have been conducted in the morning hours before noon to the installation sites of hunting equipment for birds in general and the Indian Mynas in particular, which are located within the Gaza Strip and along its eastern borders. Animal markets, pet stores and zoos were also visited to study their content of Indian Myna and other birds. Several discussions were held with local residents, farmers, bird hunters and breeders in markets and pet shops to obtain more information about the traps and dangers of Indian Myna in addition to its trade in the Gaza Strip. When needed, binoculars and digital cameras were used for monitoring and documentation.

3. Results

3.1 Occurrence of Indian Mynas in the Gaza Strip

Prior to 2006, the few studies available on wildlife did not indicate the presence or occurrence of Indian Mynas, in the Gaza Strip. All scientific and public parties in the Gaza Strip recognized the appearance of this invasive bird in 2006 as a starting date, as small numbers were seen on electricity poles and wires, on the roofs of tall buildings, and in gardens and parks as well. After 2008, the numbers of Indian Mynas began to increase significantly, and the bird became familiar to most of Gazans. Many bird hunters trapped large numbers of them to be sold in animal markets and pet bird shops at very low prices, and some people and hobbyists began to have Indian Mynas in cages inside their homes as pet birds.

3.2 Habitats of Indian Mynas in the Gaza Strip

Indian Mynas are well adapted to urban and suburban areas where feeding sites are available. The findings of the current study showed that Indian Mynas were abundant year-round in the urban areas of the Gaza Strip. They seem to be successful

urban exploiters that persist successfully in urbanized landscapes and their occurrence seems not to be influenced by seasonal changes. The main habitats of Indian Mynas in the Gaza Strip include urban parks, gardens, resorts, universities, hospitals and playgrounds characterized by the presence of irrigated green grass and tall trees such as Date Palm (*Phoenix dactylifera*), Mexican Fan Palm (*Washingtonia robusta*), Norfolk Island Pine or Christmas Tree (*Araucaria heterophylla*), River Red Gum (*Eucalyptus camaldulensis*), Royal Poinciana (*Poinciana regia*), Kurrajong or Bottletree (*Brachychiton populneus*), Rubber Fig (*Ficus elastica*), etc. Habitats also include buildings in governmental and non-governmental institutions. Gazans often see Indian Mynas resting on power lines, buildings, shops, and schools, or strutting in squares, stadiums, and parks. The birds were commonly seen invading yards and feeding on the same seeds and food scraps that attract native birds to feed on. Indian Mynas were attracted to places where livestock, domestic animals and chicken farms are located, where animal foods such as goat, horse and donkey feed and chicken pellets are found. They were also seen feeding on animal dung near beast pens and in some streets of the Gaza Strip. As far as the nesting places of Indian Mynas are concerned, they have been seen nesting locally in the gaps, holes and crevices of buildings, gas stations, air conditioners, rooftops, gutters, tree cavities, dry fronds of Date Palm trees and everywhere that supports their nest construction. In this regard, several nesting cavities were observed in the buildings of the main campus of the Islamic University of Gaza where the author works. The Indian Mynas were seen chasing House Sparrows (*Passer domesticus*) and occupying their nests in the same place.

3.3 Origin of Indian Mynas in the Gaza Strip

The Indian Myna is a tropical and subtropical Asian bird that has been introduced into many regions of the world. The predominantly Indian Myna population throughout Palestine, including the 365 km^2 Gaza Strip, appears to have originated from cage escapes from zoos and pet stores, or even deliberate releases in Israel. It is believed that Indian Mynas were first brought to Israel more than two decades ago to be bred in zoos. However, they escaped, and began to breed in the wild, initially in Yarkon Park in Tel Aviv. After the expansion of its range in the Palestinian territories, few numbers of this species were observed in the Gaza Strip in 2006, and after a short period their numbers increased significantly. Nowadays, the numbers of Indian Mynas and their distinctive sounds fill all parts of the Gaza Strip, and this bird has become one of the most popular locally. A few Gazans claimed another story explaining how the Indian Myna invaded the Gaza Strip. The story tells that the Israeli security forces, which controlled the Rafah crossing (the land port between the Gaza Strip and the Arab Republic of Egypt) before 2006, seized a couple from the Indian Myna with a passenger who tried to smuggle them to the Gaza Strip. At that time, the Israeli security forces released the birds, so the couple took the Rafah crossing, which is full of tall trees and shrubs, as a place to breed and multiply, and from here the real spread of the Indian Myna began in the Gaza Strip.

3.4 Potential risks of Indian Mynas

3.4.1 Threats to native biodiversity

The Indian Myna is characterized by its excessive aggressiveness towards some of native bird species. It displaces birds from breeding sites, obstructs nests and even preys on eggs and chicks or sometimes evicts them. The bird may live in the artificial structures such as buildings, which gives it an advantage over species that only nest in trees. Depending on the visits carried out and the meetings and discussions with stakeholders, many native bird species have been listed to be negatively affected by Indian Mynas (Table 1).

Table 1: Some native birds that could be negatively affected by Indian Mynas

Family	Scientific Name	Common Name
Passeridae	*Passer domesticus* Linnaeus, 1758	House Sparrow
Upupidae	*Upupa epops* Linnaeus, 1758	Eurasian Hoopoe
Paridae	*Parus major* Linnaeus, 1758	Great Tit
Picidae	*Dendrocopos syriacus* Hemprich & Ehrenberg, 1833	Syrian Woodpecker
Pycnonotidae	*Pycnonotus xanthopygos* Hemprich & Ehrenberg, 1833	White-spectacled Bulbul
Columbidae	*Columba livia* Gmelin, 1789	Rock Dove
	Spilopelia senegalensis Linnaeus, 1766	Laughing Dove

3.4.2 Damage to domestic life

Gazans are famous for raising many domestic animals and poultry in barns, farms, orchards, or on the roofs of homes, especially in light of the existing political and economic conditions due to the Israeli siege on the Gaza Strip since 2005 and the high rates of poverty, unemployment and lack of job opportunities. The steady increase of Indian Mynas in the Gaza Strip is causing them to attack those domestic animals. The author examined the fierce attack of the Indian Myna on a Domestic Pigeon (*Columba livia domestica* Gmelin, 1789) lying in its nest, to be killed by evil killers. Such an incident has been repeated with other domestic birds, as indicated by some of the Gazans who were interviewed. Some animal breeders also complained of Indian Mynas attacking their domestic animals (horses, donkeys, mules, cows, goats, and sheep), causing cuts and ulcers on their bodies. Some poultry breeders who raise domestic birds and pets on the roofs of their homes and in their yards complained about the Indian Myna attacking in remarkable numbers for the types of feed and food provided to these creatures.

3.4.3 Damage to agricultural crops

Indian Mynas are omnivore or a multi-feeding bird, feeding on agricultural crops such as grains and fruits, remains of human food, insects and small animals like amphibians, lizards, baby birds and rodents in addition to bird eggs. This means that its flocks can attack agricultural fields and cause certain harm to farmers. Since a decade, many Gazan farmers have complained that the Indian Myna has attacked a big list of locally grown fruits, including grapes, figs, guava, mangoes, plums, oranges, pears, apples, pomegranates, almonds, peaches, bananas, strawberries, watermelon, dates,

etc., causing losses. Cereals crops such as sunflower, corn, wheat and barely are susceptible as well, where they are commonly cultivated near the eastern borders of the Gaza Strip.

3.4.4 Inconvenience and noise

Indian Mynas are communal or social birds that roost in relatively large flocks on high buildings and locations causing inconvenience and noise to people. Husbands and even small numbers of Indian Myna are known among Gazans for their "disturbing" sounds, even if they have not seen the birds. These birds now fill the yards and wooded and grassy courtyards in universities, hospitals and other Palestinian institutions, as well as parks, public gardens and resorts, and their loud noises cause noticeable disturbance to Gazans, although some Gazans claim that they enjoy hearing their sounds. During roosts, these birds are known to leave dirt, which results from droppings they leave on roofs and walls of buildings and constructions. This dirt distorts the appearance of buildings and homes from the outside, which creates inconvenience and discomfort among Gazans. Of course, it is not strange to hear voices among the Gazans calling on the competent authorities to find quick solutions to this annoying bird, as they describe it.

3.4.5 Possible transmission of diseases

The Indian Myna is considered one of the most birds that have the ability to transmit pathogenic agents like parasites, bacteria and viruses which may cause fatal diseases to humans and animals. Indian Mynas are known to carry diseases, such as avian influenza (bird flu) and salmonellosis, and parasites such as mites (eight-legged arthropods), which by their bites can cause dermatitis (skin irritation) in humans.

3.5 Potential benefits of Indian Mynas

Despite the risks that the Indian Myna carries, there were some positives according to meetings and discussion with local people:

1. The Indian Myna is considered one of the ornamental birds that many Gazans used to keep it in their homes in cages, because of its beautiful sounds in addition to its small size and bright colors. In addition, Indian Myna has the ability to imitate and speak words or even sentences.
2. The Indian Myna serves Gazan farmers, as they consider it a friend because of its ability to eat insect pests that destroy agricultural crops, especially the Red Palm Weevil (*Rhynchophorus ferrugineus* Olivier, 1790), which in the last decade has become a threat to Date Palm trees in the Gaza Strip. In other words, the bird is considered a good biocontrol agent against some agricultural pests; particularly insects.
3. Although it seems surprising, some Gazans claimed that the Indian Myna is trapped locally for food purposes, with few slaughtering and eating it, especially since it is sold at cheap prices (2-3 USD per pair).
4. From an educational and cultural point of view, the spread of Indian Myna near human dwellings and its leisurely feeding on leftover foods in the streets and gardens makes it possible for Gazans to observe it and to identify its charming features. This is a good step and comes in handy for beginners in birding (bird watching), either with naked eye or with binoculars. How beautiful it is for a person to spend time to learn the behavior of the Indian Myna, which is lively and active. The author stayed for a while in his office to observe from the office's windows the social behavior of the Indian Myna in the grassy court of the Islamic University of Gaza, especially when it competes with the Hooded Crow (*Corvus corone*) and the House Sparrow (*Passer domesticus*) for space and food.

3.6 How do Gazans trap Indian Mynas?

Despite the many ways in which wild birds are trapped in the Gaza Strip, the most common methods of catching the Indian Myna are netting or sticks coated with glue as follows:

1. **Netting:** When the sun rises in the morning, bird hunters usually head to the open areas throughout the Gaza Strip to catch Indian Myna among other passerines through their nets. The tactic used in this method lies in attracting Indian Mynas to trap them in the nets by placing and tying two or more Indian Mynas; known locally as "*horeek*", near the nets, where their feet are fixed with a rope that the hunter holds at the end. Mostly, hunters place the mynas (bait) on or near tree branches or other objects. The hunter here moves the rope from time to time to force the two birds to move, which contributes to attracting Indian Mynas and sometimes other bird species. As soon as one of the birds falls into the trap or the net, the hunter directly pulls another rope connected to the net to close the net on the bird and ensure that it is caught. The hunter puts the Indian Myna caught in a small cage, and keeps repeating this action to catch more birds. Some bird hunters were able to bring audio recordings of the myna's song as a way to lure it into the nets designated for trapping it. The author was able to enumerate more than 15 birds from the Indian Myna alone that fell during one hit to one of the trapping nets while observing the hunting of birds in the eastern areas of the Gaza Strip (Figure 4). Of course, it was a huge blow to the bird hunter, who soon collected the birds to sell later to pet shops in Gaza City.

Fig 4: A group of Indian Mynas fell during one strike of a trapping net in the Gaza Strip

2. **Glue-coated sticks:** This effective method requires less effort than netting, and is summarized by applying the glue as an adhesive to sticks attached to tree trunks (e.g. Date Palm trees) or other objects where Indian Mynas are found in farmland and orchards. This method is similar to the netting method of using mynas as bait to attract the birds of the same species that are hovering in the area to the glue-coated sticks to fall on. Once the birds fall on the sticks, they will not be able to escape and it will be easy for the bird hunter to collect the caught birds in special

cages nearby.

3.7 Local trade in Indian Mynas

The main objective of catching Indian Mynas in the Gaza Strip is to sell the birds in pet stores and animal markets (Figure 5) and earn revenue. Repeated visits to the Yarmouk Market in the center of Gaza City revealed wire cages containing dozens of Indian Mynas. The same number applies to the pet stores that are prevalent in the entire Gaza Strip. The Indian Myna, which is by far the most common birds sold at pet shops, is sold at a cheap price of 2-3 USD per pair. Many Gazans were found buying Indian Mynas to keep as pet birds at home. They claimed that the Indian Myna could be taught words and sentences to imitate and speak. They added that Indian Mynas are good imitators and soon pick up words and sentences, much like parrots and parakeets.

3.8 Indian Mynas as a human food

Some Gazans claimed that they eat the meat of the Indian Myna, like some other wild birds that they hunt, especially since the Islamic religion did not mention the prohibition of eating the meat of this bird. Few of those who ate the meat of the Indian Myna claimed that the meat of this bird could not be compared to the delicious meat of other birds hunted in the Gaza Strip, such as Chukar (*Alectoris chukar*), Common Quails (*Coturnix Coturnix*), Rock Pigeons (*Columba livia*) and doves (*Streptopelia spp.*), and even House Sparrows (*Passer domesticus*).

3.9 Local management means of Indian Mynas

The Gazans do not seem to care much about the need to combat Indian Myna because of its negative impact on some forms of wildlife, as they hunt large numbers of wild animals and threaten their sustainability. On the other hand, the Indian Myna does not pose a great threat to agricultural crops and domestic life in the Gaza Strip, and therefore there are no clear means adopted by the local responsible authorities to control the bird. The ongoing Indian Myna hunting operations are not aimed at controlling the bird but rather a source of livelihood for the bird hunters. Some of the Gazans were able to fire their cartridges and rifles towards Indian Mynas, which spread in remarkable numbers in their environments near their homes or orchards, in order to injure or kill them as a form of sport or to take revenge on them for harming their agricultural crops or their domestic animals. In an agricultural area east of Rafah city, in the far south of the Gaza Strip, a citizen was seen carrying a hunting rifle trying to kill a number of Indian Myna birds because of their attack on the nests of Domestic Pigeons (*Columba livia domestica*) that he raises at home, which ate the eggs and killed the chicks.

Fig 5: Indian Mynas in trade: (A) The author holds the Myna at home, (B) The author holds the Myna at an animal market, and (C) Caged Mynas at an animal market

4. Discussion

The year 2006 is considered the year of the appearance of the Indian Myna in the Gaza Strip, and what may confirm this statement are the extended experience of the author in wildlife ecology, farmers and wildlife hunters who are in direct contact with species of birds, and the absence of studies or scientific reports proving the existence of the bird before this date [2, 3, 7, 8], but on the contrary, several studies have shown that the bird occurs in considerable populations after the years 2006/2007 [5, 6, 37]. Although the bird appeared in 2006, it only took a short period of time and its numbers began to increase at a very high rate. At the end of the first decade of the second millennium, Gazans were surprised by the rapid distribution of Indian Mynas all over the Gaza Strip. Holzapfel *et al*. [11] showed that the striking point regarding the current spread of Indian Mynas in Israel is the very short time interval of only a few years from first appearance to rapid spread. In Israel, sightings increased from a single location in Tel Aviv in 1997 to sightings all over the area by 2003 [11].

Among other native bird species, Indian Mynas are easily identifiable in the Gaza Strip, as there are no other species of wild birds so similar in appearance to be confused with. Even birds of relatively dark colors in the Gaza environment, such as Hooded Crows (*Corvus corone*), European Jackdaws (*Corvus monedula*), Common Blackbirds (*Turdus merula*), and European Starling (*Sturnus vulgaris*), appear to be clearly marked and sized and cannot be confused with the Indian Myna. The high density of Indian Mynas in the Gaza Strip is encouraged by the easy access to human food remnants in the urban environment; garbage accumulated in streets and squares, and feed spillage while feeding domestic animals such as chickens and livestock in barns and orchards.

The current spread of the Indian Myna in Palestine and other Middle East countries is likely the result of deliberate introductions or accidental escapes from zoo cages. There seems to be a consensus in many Middle Eastern countries regarding the mechanism of propagation of invasive Indian Myna, as evidenced by some studies [5, 11, 24-27, 31, 32, 36, 38]. In the Palestinian territories, there is almost unanimity in the Gaza Strip and the West Bank that the first spark for the spread of Indian Myna in the region was their escape from a zoo in Tel Aviv. Such a thought was confirmed by Holzapfel *et al*. [11] who explained that the beginning of the appearance of the Indian Myna in Tel Aviv area was due to its escape from the Tzapari Zoo, which is located in the middle of the HaYarkon Park in Tel Aviv. They added that the first free-nesting pairs of the Indian Myna used Date Palm plantation in Park HaYarkon. Even in Egypt, it was believed that the Indian Myna sightings of North Sinai came as a result of their spreading south and west from their breeding population in Israel [31].

The various urban green spaces and the high density of buildings in the Gaza Strip paved the way for the occurrence, proliferation and spread of Indian Mynas in the Gaza Strip. In addition to the extensive cultivation of Date Palms [41, 42], the urban environment of the Gaza Strip is full of native se well as exotic trees and shrubs that attract wildlife including the species in question [5, 6, 43, 44, 45]. Wadi Gaza Nature Reserve, which lies in the middle of the Gaza Strip, embraces on its banks countless types of orchards, plantations and wild trees and shrubs [46] that support the flourishing of wildlife, including the Indian Myna (*Acridotheres tristis*) and the Rose-ringed Parakeet (*Psittacula krameri*) as invasive birds in the Gazan environment (Personal Observations). These two invasive birds have remarkably succeeded in exploiting the nesting cavities and holes found in the trunks of trees and shrubs that decorate the green spaces, most of which were established after the arrival of the Palestinian National Authority (PNA) to the Palestinian Territories in 1994 [47]. Holes in buildings have been noted as good attraction factors to the Indian Myna to breed in as well [5].

The current study presented in Table 1 a list of native bird species that could be adversely affected by the presence of invasive Indian Myna in the local urban environment. Of course, the list may seem modest here, but the list would be longer if the study focused on the indigenous species with which the Indian Myna might compete and which, according to Gazan farmers, are many. The Indian Myna is well adapted to urban environments, often taking the nests of other species and sometimes even evicting chicks that are still there [5, 48]. In Israel, biological invasion by non-native species is recognized as one of the major threats to native species and ecosystems and such invasions are contributing to biodiversity decline as pointed out by Holzapfel *et al*. [11] and Orchan *et al*. [15]. A new study has shown that while some native bird species in Israel are declining, non-native species are thriving in their place [21]. To be more accurate, the bird community in HaYarkon Park in Tel Aviv strongly changed from native based communities with the House Sparrow (*Passer domesticus*), Hooded Crow (*Corvus corone*), Cattle Egret (*Bubulcus ibis*) and Spur-winged Lapwing (*Vanellus spinosus*) as dominant species in 2003 to alien community dominated by the Indian Myna (*Acridotheres tristis*), Monk Parakeet (*Myiopsitta monachus*) and Rose-ringed Parakeet (*Psittacula krameri*) in 2017 [21]. Moreover, the House Sparrow (*Passer domesticus*) population has declined by 28%, and the White-spectacled Bulbul (*Pycnonotus xanthopygos*) population has dropped by 45% in Israel due to the three non-native invasive species; namely the Indian Myna (*Acridotheres tristis*), Rose-ringed Parakeet (*Psittacula krameri*) and Monk Parakeet (*Myiopsitta monachus*). Meanwhile, numbers of Common Myna and both Monk and Ring-necked Parakeets have increased dramatically; the Myna at 250% and the two Psittacids by a whopping 843% [21].

In fact, much work has been done to assess the negative impacts of Indian Myna on native wildlife species in several countries across the world [15, 16, 20, 49, 50-61]. For this reason and many others, the Indian Myna was declared by the IUCN Species Survival Commission in 2000 to be one of the most invasive species on the planet and one of only three birds to make it into the 100 species that most threaten biodiversity [62]. In French, Indian Mynas are reported to predate on the critically endangered Marquesan Kingfisher (*Todiramphus godeffroyi*) and represent a major threat to the critically endangered Tahiti Flycatcher (*Pomarea nigra*) [63]. The negative impacts of the Indian Myna were found to extend to seabirds as well. Byrd [64] found Indian Mynas to be significant consumers of the eggs of Wedge-tailed Shearwaters (*Puffinus pacificus*) in the Hawaiian Islands. Similarly, Hughes *et al*. [57] found Common Mynas to be a major predator of the eggs of Sooty Tern (*Onychoprion fuscatus*) on Ascension Island in the South Atlantic. Grarock *et al*. [53] found a negative relationship between the establishment of the Common Myna and the long-term abundance of three cavity-nesting species and eight small species of Australian birds. In a seemingly contrary study,

Lowe *et al*. [65] revealed that Indian Mynas have little competitive effect on resource use by native bird species in the urban matrix of Sydney, Australia.

The feeding habits of the Indian Myna as an omnivore make it feeds on plant crops, insects and small animals in addition to bird eggs. The Indian Myna was one of the farmland birds causing damage to agricultural crop in India, with a little knowledge available of actual economic loss [66]. The list of fruits and vegetable materials attacked by Indian Mynas in the Gaza Strip appears to be similar to the list proposed by Peacock *et al*. [10] from South Africa who pointed out that Indian Mynas could feed on the ripe fruits and seeds of plants such as figs, papaya, mango, hot peppers, dates, apples, pears, tomatoes, and grain crops such as maize, wheat, and rice. In a very recent study, Abd Rabou [47] showed that the Rose-ringed Parakeet (*Psittacula krameri*) resembled the Indian Myna in causing the same damage to agriculture in the Gaza Strip. In the West Bank of Palestine, Handal and Qumsiyeh [38] observed that Indian Mynas fed on a lot of animal matter including bird eggs and the Green Lizard (*Phoenicolacerta laevis*). They also noted that the birds successfully compete with Jackdaws (*Corvus monedula*) for road-kills and food from rubbish dumps. Feare and Craig [67] asserted that Indian Mynas are egg predators, eating the eggs and chicks of seabirds as well as small passerine birds.

As far as the diseases that could be transmitted by the Indian Myna to humans are concerned, they are many. It is known that due to its close association with humans, the Indian Myna can spread disease by scavenging in outdoor eating areas. The large, untidy nests of Indian Mynas are commonly built using sticks, straw, feathers, and human-generated litter such as scraps of paper, plastic, and other things. If these nests are built in roofs of houses and cavities, they may represent a fertile ground for the spread of diseases to humans such as asthma and dermatitis because of the mites (phylum Arthropoda) they carry [68]. Moreover, there have been reports of Indian Mynas attacking people. These attacks can cause serious injury, with one man receiving a lacerated left eye after being struck [69]. Like other bird species, Indian Mynas can spread avian influenza as well because of the big roosts they form [68].

The most common methods of catching Indian Mynas were nets and sticks coated with glue. These methods are usually applicable in catching different types of birds in the Gaza Strip, especially songbirds [3, 4-6, 70, 71]. A blow to a net can catch 10-15 Myna birds, as the author observed. This could be attributed to the communal nature of Indian Mynas; they form big roosts [72]. Sometimes loudspeakers or birds of the same species were used as bait to lure birds into the trap. Such a large number of Mynas trapped could be a positive sign in the sense that these birds are actual pests that need to be combated. The trapping harvest finds its way to the shops that sell pet birds scattered throughout the Gaza Strip, and some of the harvest may be sold for feeding purposes. Bird shops are widely spread in the Gaza Strip and are rich in dozens of species of domestic and wild birds, as shown by the Al-Sweirki [9]. The price of one pair of Indian Myna ranges from 2 to 3 USD. If the price is multiplied by the large number of trapped Indian Mynas, it will provide a modest source of income for bird hunters who do not have a job opportunity or are already poor. In some countries of the world, trapping activities of Indian Myna using nets are commonly considered as a control means [51, 72, 73-76].

In spite of the fact that Indian Mynas are omnivorous; feeding on a huge variety of fruits, insects, larvae, amphibians, lizards, eggs, small animals, and they scavenge for garbage occasionally [77, 78], a few Gazans were found to eat the bird. They claimed that some scholars have permitted its eating from a religious point of view by saying that it is clear that Myna birds are among those that it is permissible to eat. The permission of eating this bird may come because there is nothing to indicate that it is unlawful "haraam" [79]. Indian Mynas are social and energetic as they are friendly and intelligent and are well adapted to live in cages, making them pampered and graceful birds that they can breed in captivity. This fact has made Gazans aficionados of acquiring them on their list of pet birds. Their cheap prices are also an encouraging factor in their acquisition. Their intensive trapping operations have reflected on their presence in huge numbers in animal markets and pet stores, whether in the Gaza Strip [9] or the West Bank [39] or even in Jordan as a country closely attached to Palestine [22]. In Egypt, Indian Mynas are not commonly kept as pets [31].

Understanding the impact of an introduced species is essential for effective management. The Indian Myna can be currently categorized in the Gaza Strip as a fully invasive species, necessitating good management tools. No one knows what will be the future and conditions of the Indian Myna in the Gaza Strip? Will it represent a real pest in Gaza society and therefore needs to be combated? If the future is on the side of the bird, this means that Gazans should beware of it and try to reduce its numbers. The above-mentioned netting method is not a single control mechanism, but there are obvious things to be aware of. Indian Mynas thrive in areas with a lot of free food that must be cleaned regularly. If Indian Mynas nests are discovered, it is better for their eggs to be destroyed before they hatch. More attention should be paid to the methods of providing fodder for livestock, poultry, and even pampered animals so that they are not robbed by Indian Myna birds. This means that a farmer should feed his chickens and ducks in a secure pen so Mynas can't get to the food. A person should be sure to wear gloves when handling discovered nets to prevent irritation from the mites. In all, the current study recommends appropriate management strategies to stop or reduce the spread of non-native biota in the Gaza Strip when their numbers increase alarmingly and their harm increases to an intolerable extent. In many localities throughout the world, the control of Indian Myna achieved good results regarding bird species. During Indian Myna control in New Zealand, Tindall *et al*. [51] documented increases in the numbers of many small indigenous birds as well as introduced species.

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