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Global Distribution of Invasive Monk Parakeets (*Myiopsitta monachus*)

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Simple Summary

The Monk Parakeet (*Myiopsitta monachus*) is a highly adaptable parrot species that has been described as invasive in 26 countries globally. Their adaptability to new environments and resilience is associated to the wide variety of habitats and resources they can colonize and use for survival. In addition, they are highly sociable and have the unique ability -among parrots, to build communal nests. The Monk Parakeet is considered a pest in many countries due to the economic losses they cause. Besides impacts to agriculture, they damage urban structures, and they produce socioeconomic costs related to control measures. Here, we assessed the changes in global distribution of Monk Parakeets during the last century, and we relate it to economic and sociodemographic variables to discuss the potential influence of this species upon human populations. We used Monk Parakeet's sighting data from eBird online platform to collect historic and recent reports on its distribution. For demographic data, we searched the UNdata online platform, along with other official and trusted online sources. This information is useful to provide a preliminary assessment of potential impact of the species worldwide and contribute with valuable data for informed decisions, regarding monk parakeet control.

Abstract

The Monk Parakeet is a psittacid species native to South America and introduced into many territories due to their demand as pets. It has proven to be successful in establishing in new territories, capable of reproducing, propagating, and exhibiting a population growth in introduction sites during few decades. It is considered a pest due to negative impacts, especially for its damage to agriculture and urban infrastructure. Global distribution of this species has been described, however considering that this species is highly adaptable and effective in colonizing new environments, many of these distribution maps may be outdated. We used eBird, a free online birding database, to locate sightings of this species globally and compared it with the reported range for the species. Additionally, we overlaid gathered data on species distribution with economic and demographic human data, to explore if there is a correlation between parakeet abundance and wealth and to assess human exposure to their impacts. We collected data since 1900 up to 2024 and compared observed differences in Monk Parakeet presence. Our results indicate that Monk Parakeets have invaded at least 31 countries, being present in capital cities, cities, towns, and rural territories. The number of cities where the species was sighted increased significantly since 1985, on average a 150% by decade. We found a significant and positive correlation between the number of cities invaded and the GDP *per capita* for the countries. We present new evidence on Monk Parakeet's rapid global expansion and deliver an updated map of Monk Parakeet global distribution, relevant for planning and implementing control measures.

Keywords: alien species; eBird; ecological invasions; Gross Domestic Product; globalization; human demographics; impact assessment; invasive psittacine; Monk Parakeet

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1. Introduction

Invasive alien species are the result of human activities. Either intentionally or accidentally, humans have been increasing the distribution of many species (Richardson *et al*., 2000). A fraction of these, are able to establish and become abundant, producing associated impacts (Richardson *et al*., 2000; Essl et *al*., 2018). The number of invasive species is increasing globally, and they represent the second most threat to biodiversity, and the first on islands (Clavero and Garcia-Berthou 2005; Simberloff *et al*. 2013; Seebens *et al*., 2017). Their associated economic costs are estimated to be greater than 300 billion per year globally (Pimentel *et al*. 2000; Genovesi 2011). Invasive birds may produce large environmental impacts, through competition to other animals, including competition, predation and/or parasitism. They also have caused large socio-economic impacts through effects upon agriculture, human infrastructure, human health and human social life (Shivambu *et al*., 2020). Among birds, parrots are the most prominent pet birds worldwide and the large volume of pet-trade driven exports followed by scape and release, resulted in the establishment of numerous alien populations globally (Reino *et al*. 2017).

Monk parakeets have been recognized among the most invasive bird species worldwide, displaying a strong inclination to invade a wide range of territories and environments (Senar *et al*., 2021). There is growing evidence that biological invasions have detrimental effects on public health, agriculture, biodiversity, and ecosystem health (Mack *et al*., 2000; Sakai *et al*., 2001). In many countries, such as Chile, Mexico, and numerous others, imports of monk parakeets have been banned by law for various reasons. Additionally, they are classified as pests in many countries (Ley de caza 1996; Hobson *et al*., 2017). They have been associated to agricultural losses and are considered agricultural pests, even in their native Argentina, where it has been reported that Monk Parakeets cause an estimated loss of US$ 1 billion per year in crop damages (Iriarte et al., 2005; Senar *et al*., 2016; Butcher *et al*., 1992; Spreyer & Butcher, 1998). Some of the impacts are also associated to the construction of their nests, that may become large and heavy, affecting the structures in which these are built, as buildings and electric posts. In Florida, it was estimated that these nests cause more than 1,000 power outages per year with annual costs up to one million dollars a year for their removal, adding the risk to personnel conducting these interventions (Avery et al., 2002). In Chile, over a span of almost five decades, the invasive range of Monk Parakeets has expanded significantly (Briceño et al., 2022). Initially, they were restricted to the Metropolitan Region and its immediate surroundings when they first became naturalized invaders in 1972 (Iriarte *et al*., 2005). Today, their presence has been documented outside their original introduction range (Iriarte et al., 2005; Briceño et al., 2022) and recorded on the eBird platform (eBird 2024) in nine other regions in Chile, and in -at least- 15 other cities, to the north and south of the Metropolitan Region.

In a long-term longitudinal study conducted by Senar at al. (2019) in Spain, Monk Parakeets displayed exponential population growth since 1970, when their first nest was detected in Barcelona. The aforementioned researchers determined breeding parameters of Monk Parakeets in their invasive range. This invasive population showed higher reproductive capacity compared to native populations, even doubling their fledging success rate (i.e. offspring able to leave the nest). Furthermore, 55% of first-year birds bred, a stark contrast to South America's native populations, where breeding in first-years is extremely rare. There were also three times higher percentage of pairs attempting second broods. This phenomenon could be attributed to a much lower incidence of nest predation in their invasive range. Additionally, the breeding season was one month longer in the European invasive range, lasting nearly seven months; from March to the end of September, as opposed to the native range, where it spans around six months; from October to March (Senar et al., 2019).

In recent studies in Chile, zoonotic pathogens and ectoparasites have been identified in Monk Parakeets, posing health threats to both humans and local fauna (Briceño *et al*., 2017; Briceño *et al*., 2021; Sandoval-Rodríguez *et al*., 2021; Briceño et al., 2023; Larraechea *et al*., 2023). However, to date, none of these agents have been fully investigated regarding the role of Monk Parakeets as potential reservoirs and their impact upon human health.

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We ought to consider that the primary reason for the existence of naturalized parrots globally is human activity (Crowley, 2021). Regardless Monk parakeet's negative impacts, civil society has a positive view about this species and often appreciates them (Ribeiro *et al*., 2021, Larraechea *et al*., 2025). Monk Parakeets are still regarded as pets, and in their natural habitat, people commonly seek contact with the species through practices like bird feeding (Sol *et al*., 1997; Peng & Broom, 2021). However, there is a growing awareness among some citizens who recognize the negative effects of these naturalized parrots and prefer to see them removed from natural ecosystems (Crowley, 2021; Larraechea *et al*., 2025). These significant human-wildlife interactions can often hinder the implementation of control measures for invasive species, particularly when dealing with "charismatic" wildlife like Monk Parakeets (Crowley *et al*., 2019). In England, for instance, control measures for Monk Parakeets have faced significant public opposition (Crowley *et al*., 2019). Understanding a species' invasive process is important to define control measures, mitigate negative impacts, and predict future expansion ranges (Dawson Pell et al., 2021; Larraechea *et al*., 2025).

The present study aims to update the global distribution of invasive Monk Parakeets based on current sightings of this species and reports, and testing whether its distribution increase is related to economic prosperity.

2. Materials and Methods

2.1. Study Species

The Monk Parakeet (*Myiopsitta monachus*) is a parrot species native to South American countries of Argentina, Bolivia, Brazil, Paraguay and Uruguay. Due to wild species trafficking to provide for the pet demand, the global distribution of this species has increased drastically over the last few decades (Briceño et al., 2022: Edelaar et al., 2015). Currently, it is considered an invasive species in 26 countries worldwide (Calzada & Pruett-Jones, 2021).

This medium-size, non-migratory bird species inhabit their nests year-round and are typically found near human settlements, in both urban and suburban environments (Eberhard, 1998; Forshaw, 2010; Sol *et al*., 1997; Senar et al., 2021a). They are non-territorial and a highly social parrot species, capable of living in a wide range of habitats, including open forests, savanna woodlands, farmland, urban parks, and others (Senar et al., 2021b; Sol et al., 1997). Their diet is based on seeds, leaf buds, some fruits, berries, flowers of various plants, and occasionally, insect larvae (Sol et al., 1997). It has also been described that a significant portion of the Monk Parakeets' diet comes from anthropic sources, such as bread, peanuts, rice, and others, especially in countries where bird feeding is a common practice (Sol et al., 1997; Mazzoni et al., 2021). Monk Parakeet's broad ecological niche, high behavioral plasticity, and feeding opportunism explain its success in expanding and adapting to new environments (Postigo et al., 2021; Bucher & Aramburú, 2014).

Among the Psittaciformes order, the Monk Parakeet is the only species capable of building large communal nests, allowing them to form large family groups (Martin & Bucher, 1993). This species is considered an ecosystem engineer due to its capacity of modifying richness and distribution of sympatric birds that use their nests (Briceño *et al*., 2019). In addition to their impacts upon communities of native fauna, their large nests can cause damage to infrastructure, such as electric poles (Avery *et a*l., 2002), and pose a hazard to humans, as these heavy nests may detach from tall trees. There is also an economic cost associated to this, as many cities must allocate public funds to remove Monk Parakeet nests (Burger & Gochfeld, 2009; Senar *et al*., 2021).

2.2. Species' Distribution Data (eBird)

eBird is a free online desktop platform and mobile app, developed and managed by The Cornell Lab of Ornithology, a part of Cornell University (www.ebird.org; eBird 2024). It is one of the world's largest citizen science projects, collecting bird sightings from around the world, including data about density and distribution. This information is gathered through internet and a global network of volunteers, creating a data repository for various bird species that is available worldwide (Cornell

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Lab of Ornithology, 2023; Sullivan *et al*., 2014). This platform enables people to actively participate in citizen science by registering bird sightings, which includes details such as the location and time of the event. These sightings can be enriched with sound recordings, photos, and videos (eBird 2024; Sullivan *et al*., 2014).

Citizen science can be a powerful tool for understanding the distribution, movements, and changes in invasive species over time. However, data collected by citizens can sometimes be unreliable, lacking the assurance of data quality and highly dependent on the methods used by researchers (Kosmala et al., 2016). To address this issue, eBird has implemented a rigorous evaluation system for the data they receive: First, users are presented with a list of common species that can be sighted in a specific area. If the species being registered is rare, previously unseen, or if there is an unusually high count of that species in a particular region, the birding sighting is flagged for further scrutiny by an expert reviewer, who is typically a regional birding expert (eBird 2024; Sullivan et al., 2014). If the reviewer determines that a mistake was made, the user is notified, and the sighting will not be entered into the central eBird database (eBird 2024). This review-feedback system of the eBird platform not only improves data quality by preventing false positives from entering the database during species identification, but also aids in the training of eBird volunteers, helping them become better birdwatchers with a more precise ability to discern species for future sightings (Kosmala et al., 2016). eBird is designed to minimize data integrity problems, making it a valuable resource for large-scale questions and research (Callaghan & Gawlik, 2015).

Currently, eBird is widely used across various scientific disciplines, including conservation science and peer-reviewed papers. It is a trusted source for avian biodiversity data (eBird 2024; Sullivan *et al*., 2014). Since its launch in 2002, there have been at least 209 scientific publications, a significant number of which are peer-reviewed. These publications either explore the functionality of the eBird project or conduct scientific research using data from the platform (https://science.ebird.org/en/research-and-conservation/publications). eBird sighting records yield results comparable to those from standardized surveys, with higher diversity and species richness due to the greater effort contributed by users worldwide. Since these sightings are made in the field by volunteers, this increased effort reduces costs compared to traditional birding surveys (Callaghan & Gawlik, 2015).

To estimate the Monk Parakeet worldwide distribution, we used the eBird platform provided by The Cornell Lab of Ornithology (eBird 2024). All records for the species labeled as "Monk parakeet - Myiopsitta monachus" were carefully reviewed, and sightings were visualized using the range map available at the same platform. We employed a 20 km² grid to generate sighting maps. Two-hundred and forty-nine (249) countries were considered based upon the ISO 3166 standard, for internationally recognized countries and their codes.

In addition, and for earlier records, we considered Monk Parakeet range as described in existing literature (Web of Science; WoS), as well as information provided by the Invasive Species Specialist Group (ISSG), the Centre for Agricultural Bioscience International (CABI) Compendium, and other sources that have reviewed the specie distribution, up to the present date (Avery, 2020; CABI Compendium, 2010; Invasive Species Specialist Group, 2010).

2.3. Statistical Analyses

In this study we defined a city according to the Organization for Economic Co-operation and Development (OECD) definition of cities; considering any city having at least 100,000 inhabitants, regardless of population density. For this reason, we included a diverse range of cities, including both small urban areas and large metropolitan centers (OECD, 2019). However, we made some exceptions for certain territories under 100,000 inhabitants, in cases of small countries with smaller cities, islands, and some overseas territories, such as Bermuda, Gibraltar, the Cayman Islands, among others, where Monk Parakeets are present.

We organized the data of monk parakeets' presence from the eBird platform, classifying it by number of cities with records by country and by decades :1900–1984; 1985–1994; 1995–2004; 2005–

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2014; 2015–2024 (Annex 1). We used this approach, as we considered five decades (2024) more since the last ecological study published in Chile (Briceño et al., 2022). We also considered from 1985 to 1900 as one period, since 1900 is when eBird database begins and there were only few new records up to 1984. To assess whether socio-economic conditions could explain the observed expansion, we obtained country-level Gross Domestic Product (GDP) *per capita* (in current US dollars) from the World Bank World Development Indicators database (https://data.worldbank.org/) and, when unavailable, from official national statistics (e.g. Cayman Islands, Taiwan). For each country and decade, we calculated the average GDP *per capita*, harmonizing number formats across sources. We then evaluated the relationship between the number of cities with Monk Parakeet records and GDP *per capita* using non-parametric Spearman correlations, both globally and within each decade. To model the effect, we fitted a generalized linear models (GLMs) with Poisson and Negative Binomial distributions, including decade (orthogonal polynomial contrasts) and distributional status (native *versus* invasive) as covariates. Model fit and dispersion statistics were examined to identify overdispersion and selecting the most appropriate error structure. Mixed models with random intercepts for country were also attempted, but did not converge reliably, due to data sparsity and outliers.

3. Results

Based on historical, published reports and observations registered on eBird platform from 1900 to 2024, we found that the invasive range of Monk Parakeets encompasses, at least, 31 countries (Figure 1). Since 1985, Monk Parakeet increased on average a 154% by decade, as an exotic species in new cities, reaching up to 333 invaded cities globally in 2024 (Table 1). Overall, the increase in Monk Parakeet distribution is marked in cities and less steep but sustained in countries (Figure 2). Exotic distribution increased a 564% since the first measurement, while the global range increased 657% (Table 1).

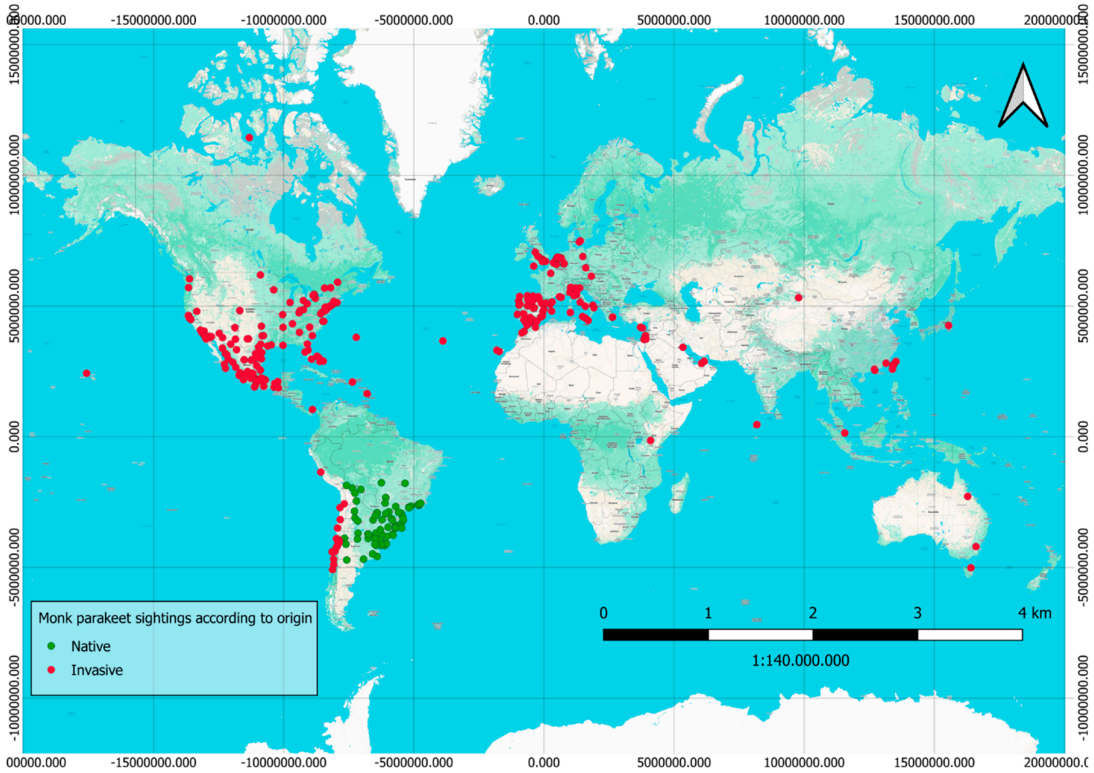

Figure 1. Global distribution of native (green) and invasive (red) Monk Parakeets (Myiopsitta monachus) sightings up to 2024.

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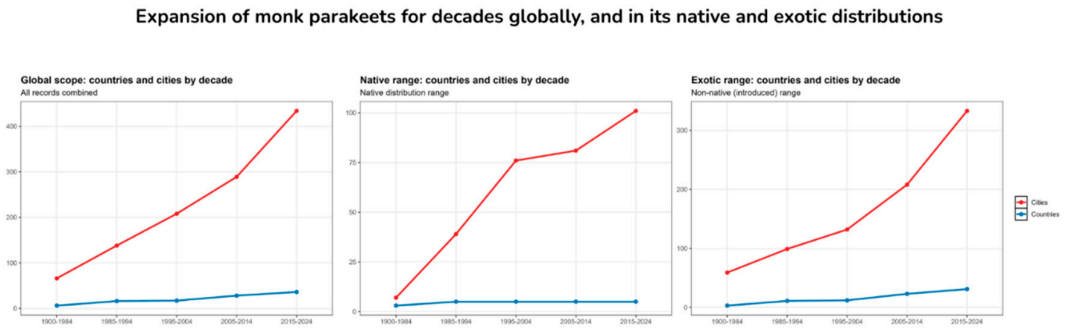

Figure 2. Distribution increase for Monk Parakeets in global, native and exotic ranges. Red represents number of cities and blue countries, by decades (x axis).

The global Spearman correlation revealed a significant positive association between GDP *per capita* and the number of cities with Monk Parakeet records ($\varrho = 0.33$, $p < 0.001$; Figure 3). However, when stratified by decade, the relationship was not significant in any individual period, with coefficients ranging from near zero to weak and nonsignificant (ϱ between –0.07 and 0.21). The Poisson regression model indicated a strong positive effect of GDP *per capita* on the number of cities (rate ratio = 2.16, $p < 0.001$), but diagnostics showed severe overdispersion (dispersion ratio = 26.7), rendering the model inadequate. The Negative Binomial model provided a better fit, confirming that GDP *per capita* is a strong predictor (rate ratio = 3.31, $p < 0.001$). Temporal effects showed a marginal quadratic pattern ($p \approx 0.055$), while native countries exhibited substantially higher numbers of cities with records than invasive countries (rate ratio ≈ 0.07 for invasive vs native, $p < 0.001$). Mixed models with random effects by country did not converge, likely due to the prevalence of zeros and extreme values in GDP *per capita*. Overall, the results demonstrate that countries with higher economic wealth tend to harbor a greater number of cities where Monk Parakeets have been recorded, consistent with the hypothesis that the global pet trade facilitated introductions, primarily in wealthier economies.

Table 1. Summary of information about Monk Parakeet distribution since 1900. Columns are organized according to global, exotic or native distributions. Cumulative increase in reported countries and cities is shown. Percentage (%) of increase include new cities by decades from 1985 to 2024. Total % of increase represents the increment in new cities since the first count until the last decade.

Distribution	**Global**			**Exotic**			**Native**		
Range of years	**N° Countries**	**N° Cities**	**% Increase**	**N° Countries**	**N° Cities**	**% Increase**	**N° Countries**	**N° Cities**	**% Increase**
1900-1984	6	66	.	3	59	.	3	7	.
1985-1994	16	138	209.09	11	99	167.80	5	39	557.14
1995-2004	17	208	150.72	12	132	133.33	5	76	194.87
2005-2014	28	289	138.94	23	208	157.58	5	81	106.58
2015-2024	36	434	150.17	31	333	160.10	5	101	124.69

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Total		**657.58**		**564.41**		**1442.86**

The countries and number of cities with Monk Parakeet reports are listed in Annexe 1. For some countries, presence of Monk Parakeets were described only in scientific reports and not in the eBird platform. Thus, for these records we lack the information regarding the number of cities invaded. Notwithstanding, we set a threshold of at least 100,000 inhabitants for inclusion criteria, certain countries and cities were still included. These exceptions considered small countries/territories such as Bermuda and Cyprus. In Bermuda, for example, eBird sightings covered the entire island, despite its total population being only 67.749 people. Similarly, in Cyprus, only the city of Ayia Nappa reports sightings in eBird, with a population of merely 2,798 inhabitants. Additionally, an exception was made for Denmark, where sightings were recorded in the small city of Køge Bugt, which has only 33,885 inhabitants.

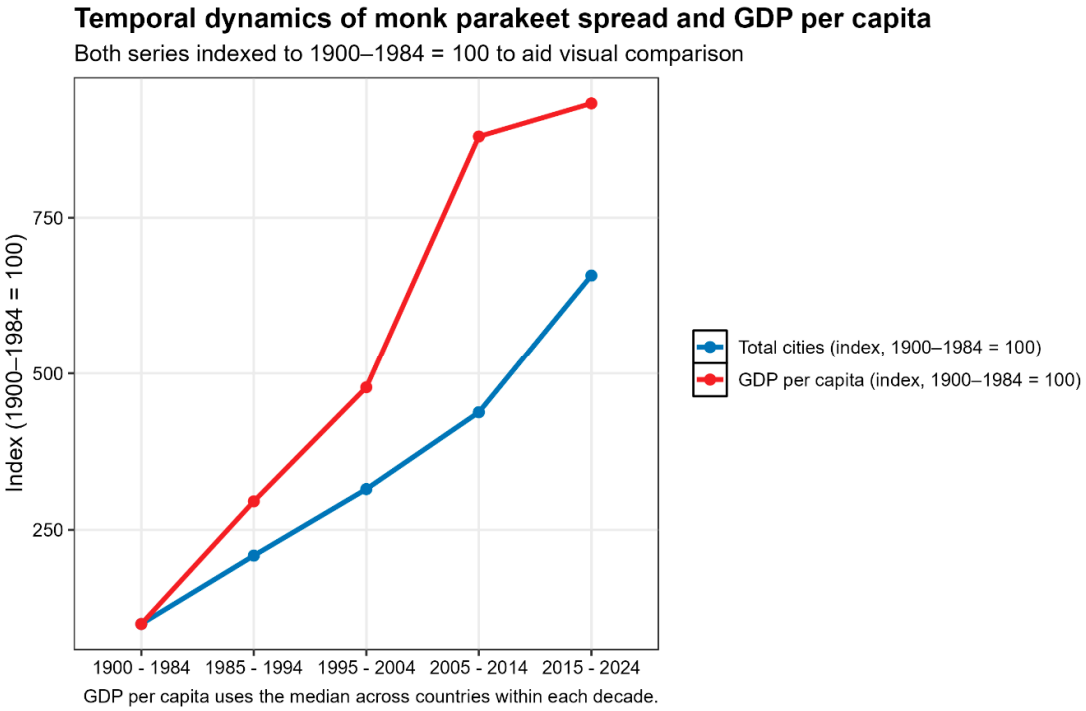

Figure 3. Relationship between Monk Parakeet increase in cities globally and Gross Domestic Product per capita index.

4. Discussion

The higher increase in Monk Parakeet distribution in the native range, and especially in the first-time lapse (557%; Table 1), is likely given imperfect records. Also, underreporting is likely given the lack of novelty for the species in its native range. Nonetheless, evidence of Monk Parakeet expansion is reported in their native distributions of Argentina, Brazil and Uruguay (Goncalves da Silva et al., 2010; Viana 2015; Rusello et al., 2008). This demonstrates the successful spread of Monk Parakeets globally, despite methodological limitations that may underrepresent their real distribution.

The Monk Parakeet continues to expand their distribution globally and represents an important avian invasion, especially given their ability to construct nests and shape their environment to their needs (Briceño et al., 2019; 2022). Up to 2024, invasive Monk Parakeet populations were reported in 36 countries globally, from which 31 were invaded. In these, countries the Monk Parakeets were introduced to supply a pet trade, and through escape or deliberated release they aggregated to

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produce reproductive units (Edelaar et al., 2015; Iriarte et al., 2005). Given their capacity to construct nests, their omnivorous diet, their synanthropic nature and potential lack of predators (Di Santo et al., 2017; Martin & Bucher, 1993), they thrived and flourish in cities, persisting and expanding in urban environments (Briceño et al., 2019; Briceño et al., 2022; Senar et al., 2019; Van Bael & Pruett-Jones., 1996).

However, the impact of this invasive species upon public health, has been inadequately assessed (Briceño et al., 2017; Briceño et al., 2021; Briceño et al., 2023). Risks to human health are related to proximity to parakeets and that in this species different zoonotic agents have been reported (Briceño et al., 2017; Briceño et al., 2021; Briceño et al., 2023; Larraechea et al., 2023; López et al., 2023; Blanco-González et al., 2024; Raso et al., 2014). Genetic evidence suggests that most Monk Parakeet propagules founding all populations globally originated from Uruguay and Argentina (Edelaar et al., 2015; Sandoval-Rodríguez et al., 2024). It is therefore reasonable to assume that the health status of Monk Parakeets in their regions of origin was somehow similar. *Argas monachus* is a tick widely distributed in Argentina and associated to Monk Parakeet nests (Mastropaolo et al., 2011). This tick can potentially affect humans (Aguirre et al., 1997). In Chile only, three zoonotic pathogens were described in Monk Parakeet populations from Santiago; *Cryptosporidium meleagridis*, *Chlamydophila psittaci*, and *Ornithonyssus bursa*, the latter potentially introduced with parakeets and thus, may also be present in other invasive populations worldwide (Sandoval-Rodríguez et al., 2021; Briceño et al., 2023; Larraechea et al., 2023; Briceño et al., 2021). Coincidently, *Chlamydophila* sp. and *Cryptosporidium* sp. are two pathogens considered underreported, as for general practitioners in human medicine may not be aware of the zoonotic potential of avian chlamydiosis or cryptosporidiosis, and instances of pathogen identification may be missed, contributing to their underdiagnosis (Raso et al., 2014; Beeckman & Vanropay, 2009; Larraechea et al., 2023). However in Chile, the health risks posed by invasive species have yet to be fully incorporated into economic impact assessments (Araos et al., 2020; Cerda et al., 2022).

This risk is underscored by emerging evidence of zoonotic pathogens carried by Monk Parakeets all over the world. *Ornithonyssus bursa* has also been found in invasive Monk Parakeet populations in Europe (Castelli et al., 2015; Mori et al., 2015). *O. bursa* bites may produce dermatitis, asthma, irritation and skin rashes in humans (Orton et al., 2000). In Brazil, eight family members were infected with psittacosis, with two requiring hospitalizations after exposure to a Monk Parakeet obtained from the illegal trade (Raso et al., 2014). Enteropathogenic *E. coli* have also been detected in Monk Parakeet populations (López et al., 2023). Moreover, as Monk Parakeets interact with other bird and animal species, transmission of these pathogens to other taxa is possible (Briceño et al., 2019; Sandoval-Rodríguez et al., 2021). In Barcelona, 38% of Monk Parakeets were seropositive to New Castle Disease Virus (Blanco-González et al., 2024). This virus can infect several other vertebrates including humans (Ul-Rahman et al., 2022). In Madrid, 21 Monk Parakeets were screened for cloacal pathogens by DNA identification, presenting infectious rates of 23.8% for *C. psittaci* and 9.5% for *E. coli*, respectively (López et al., 2023).

Based on the information about distribution that we present here, we project that more than 295 million people are in sympatry with Monk Parakeets, and almost 246 million people are sympatric with invasive parakeet populations globally. Monk Parakeets are frequently observed flying above densely populated areas, including cities (for our calculations this includes urban areas above 100,000 inhabitants). Further, parrots (*sensu lato*) may represent an important group in urban ecosystems, at least in the Neotropics (). Biological invasions are linked to the emergence of diseases and may also affect the health of people and domestic animals (Dunn and Hatcher, 2015; Keesing et al., 2012), as biological invasions have been identified as sources of spread of zoonoses (Estrada-Peña., 2014). Parakeets are reservoirs of several bacterial and viral pathogens, many that can also be zoonotic (Mori et al., 2018). Given the wide global distribution of Monk Parakeets, we emphasize the need for active surveillance of these zoonotic pathogens and suggest including others as the Newcastle virus and Avian Influenza Virus (AIV), as they have been identified in the Rose-Ringed Parakeet (*Psittacula krameri*), a species sharing invasive distribution and many similarities with Monk Parakeets (López

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et al., 2023). However, considering differences in local systems, we recommend that surveillance efforts be conducted with centralized governmental coordination and funding, rather than depending on local urban administrations (e.g., municipalities). This approach would enable a more equitable and comparative effort to be implemented. Moreover, we advocate for the consideration of health impacts in economic assessments of invasive species globally.

Citizen science has emerged as a valuable tool, increasingly utilized in recent decades to study bird species' distribution patterns globally (Dickinson et al., 2010; Royle & Donner, 2021; Falcón & Tremblay, 2018). However, working with citizen science presents well-documented challenges and limitations (Robinson *et al*., 2018), particularly in data collection influenced by various factors. Specifically, Monk Parakeet sightings reported may be susceptible to type 1 and 2 errors (false detections and false absences), despite the data quality filters implemented by the eBird platform (eBird Data Quality, 2023). It is important to consider that the use of online platforms can vary significantly depending on the country, especially in countries or regions where technology and internet access are limited (Beza et al., 2017; Poushter, 2016), as well as due to other variables such as education, income, and location of citizens (Brammer et al., 2016). Consequently, this study relied on a compilation of existing literature and data obtained from eBird platform. Despite criticisms to eBird for potential biases in estimating abundance for urban birds (Da Silva et al., 2023), we have confidence in its utility for mapping the global distribution of Monk Parakeets for three reasons: First, birdwatching and reporting biases are expected to be higher in urban areas compared to less densely populated regions, since birding intensity increases with increasing human population density (Tang et al., 2021). Second, the distinctive features of Monk Parakeets, including their conspicuous green-blue color, vocalizations, and large nests, facilitate their recognition by citizens. Third, a significant proportion of the population is familiar with Monk Parakeets. For example, in Porto, Portugal, over 60% of residents reported being familiar with Monk Parakeets (Da Silva, 2017), while in Santiago Chile at least 57% of residents recognize the species (Larraechea et al., 2025). The apparent global increase in distribution and abundance of Monk Parakeet populations may be attributed, in part, to the increased use of eBird in specific countries or regions. It's worth noting that eBird experiences an annual growth rate in reports of approximately 20% (eBird 2024). Hence, it is crucial to complement citizen science data with other research methods to accurately assess the distribution of Monk Parakeet populations in countries listed in this study. Additionally, long-term studies are necessary to monitor population growth over time. Urgent investigations are also required to determine the presence or absence of Monk Parakeets in countries bordering territories where invasions have occurred. Given Monk Parakeet's invasive attributes and maintenance as pets, invasion is possible in neighboring invaded countries or territories. One example of this is Malaysia, where sightings have not been registered in the country, while sightings in Singapore are recorded on eBird (https://ebird.org/species/monpar).

Demographic data in this study is approximate and subjected to imprecision. For instance, application of filters resulted in the exclusion of numerous other cities, implying that the true extent of Monk Parakeet distribution may be underestimated. To our knowledge, successful eradication efforts have been reported only in Deventer, The Netherlands, and in Palma de Mallorca and Zaragoza in Spain (Postigo et al., 2018). Efforts to eradicate Monk Parakeets in England have faced social opposition (Crowley et al., 2019). Despite these localized eradication attempts, the Monk Parakeet remains as a successful invasive species, steadily increasing in both abundance and distribution. Notably, Spain stands out within Europe as the only country to have banned the trade and possession of Monk Parakeets (Spanish Real Decreto, 2011; Spanish Real Decreto 630/2013; Postigo et al., 2018). Unfortunately, Spain's decision to ban Monk Parakeets, was a perverse incentive to fuel massive importation and invasion in Mexico (Hobson et al., 2017).

In various locations, the status of Monk Parakeet invasion remains outdated or unknown. In some cases, the presence of breeding or established populations is uncertain, yet these areas are still included in the distribution range of invasive Monk Parakeets. These uncertainties are particularly notable in Denmark, Austria, Kenya, Japan, the Czech Republic, and Australia. For instance, in

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Denmark, the only recorded evidence of Monk Parakeet breeding in the wild dates to 1990 (Fox et al., 2015) and has not been reassessed since. In Japan, while some authors suggest the existence of breeding or established Monk Parakeet populations (White et al., 2019), others argue that populations have failed to establish themselves (Nishida & Kitamura, 2024). As of our latest knowledge, there are no current reports on invasive Monk Parakeet sightings in the remaining aforementioned countries.

We observed significant disparities in the percentage of increase between the invasive range of Monk Parakeets (averaging 160%) and the growth observed within their native range (at 124%) over the last decade. While the increase in Monk Parakeet sightings could be explained in part to the annual expansion of eBird as previously mentioned (eBird 2024), the rapid increase in sightings within the invasive distribution of these birds, in terms of number of countries and cities, requires further investigation. It is important to ascertain whether this growth is related to more reports at the eBird platform, high invasive capacity of the species, or other factors.

The Monk Parakeet is increasing abundance and distribution in invaded territories globally (Calzada & Pruett-Jones, 2021; López-Ramírez & Róman, 2022; Senar et al, 2019). Other factors are yet to be studied. For instance, if climate change could affect Parakeet distribution and abundance. Many countries are experiencing a decrease in the number of frost days, alongside rising urbanization and human population, all of which contribute to creating a more favorable environment for the establishment of Monk Parakeet populations (Strubbe & Matthysen, 2009). Also, and recently reported, Monk Parakeets were seen for the first-time nesting in rural areas in Spain, which could be a new niche for invasive Monk Parakeet to exploit and continue their expansion (Hernández-Brito et al., 2022). Coordinated action and partnership is required, from citizens to park and animal managers, and to stakeholders. We advocate for a governmental and private alliance for cooperation, maximize resources and improve chances of controlling Monk Parakeet expansion (Briceño et al., 2013). Otherwise, the Monk Parakeet will continue increasing its invasive global abundance, distribution and impact.

5. Conclusions

The Monk Parakeet emerges as a highly adaptable and invasive bird species with the potential to produce significant ecological and public health impacts. Our study highlights the need to increase research efforts to map Monk Parakeet distribution, understand their impacts and unveil their role in the epidemiology of zoonotic pathogens, especially given their proximity to densely human populated areas.

Through available online repositories such as eBird, we updated the Monk Parakeet's distribution, identifying their presence in at least 31 countries as invasive species, representing an exponential increase associated to the wealth of the countries. This range expansion is very fast estimated at 564% in their exotic range.

With an estimated of 295,649,288 people residing in areas cohabited by Monk Parakeets, the large amount of human population exposed to its impacts warrants attention. There is a pressing need for governmental coordinated and implemented alliances to design strategies for Monk Parakeet population containment and control.

Further studies should assess and quantify Monk Parakeet impact in sympatry with human populations.

Future management should also consider mitigating ecological and public health risks posed by Monk Parakeets in an interdisciplinary collaboration addressing complex challenges at the intersection of wildlife, environment, and human health.

Supplementary Materials: The following supporting information can be downloaded at: www.mdpi.com/xxx/s1, Table S1: title.

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Appendix A

Country	Distribution	Decade	Nº reported cities	*Per capita* GDP (USD)	GDP source
Antigua y barbuda	Invasive	1900 - 1984	0	2167,99	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ATG
Antigua y barbuda	Invasive	1985 - 1994	0	6919,93	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ATG
Antigua y barbuda	Invasive	1995 - 2004	1	11181,25	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ATG
Antigua y barbuda	Invasive	2005 - 2014	1	16035,84	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ATG
Antigua y barbuda	Invasive	2015 - 2024	0	18481,38	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ATG
Argentina	Native	1900 - 1984	4	1902,48	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARG
Argentina	Native	1985 - 1994	21	4737,04	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARG
Argentina	Native	1995 - 2004	35	6400,28	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARG
Argentina	Native	2005 - 2014	34	9632,76	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARG
Argentina	Native	2015 - 2024	39	12387,58	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARG
Bahamas	Invasive	1900 - 1984	0	3499,83	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BHS

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Bahamas	Invasive	1985-1994	1	10602,97	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BHS
Bahamas	Invasive	1995-2004	0	21940,76	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BHS
Bahamas	Invasive	2005-2014	2	28464,03	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BHS
Bahamas	Invasive	2015-2024	0	32868,51	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BHS
Belgium	Invasive	1900-1984	0	5320,54	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BEL
Belgium	Invasive	1985-1994	2	18048	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BEL
Belgium	Invasive	1995-2004	1	26852,03	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BEL
Belgium	Invasive	2005-2014	3	44485,35	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BEL
Belgium	Invasive	2015-2024	3	48001,9	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BEL
Bolivia	Native	1900-1984	0	418,75	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BOL
Bolivia	Native	1985-1994	2	714,7	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BOL
Bolivia	Native	1995-2004	5	938,71	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BOL
Bolivia	Native	2005-2014	4	1973,36	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BOL
Bolivia	Native	2015-2024	5	3415,9	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BOL
Brasil	Native	1900-1984	1	927,53	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BRA
Brasil	Native	1985-1994	7	2298,95	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BRA
Brasil	Native	1995-2004	12	4038,79	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BRA

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Brasil	Native	2005 - 2014	20	9781,41	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BRA
Brasil	Native	2015 - 2024	27	9116,95	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BRA
Canada	Invasive	1900 - 1984	1	6512,29	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CAN
Canada	Invasive	1985 - 1994	5	18938,37	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CAN
Canada	Invasive	1995 - 2004	2	24001,45	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CAN
Canada	Invasive	2005 - 2014	1	46518,67	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CAN
Canada	Invasive	2015 - 2024	1	48511,42	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CAN
Chile	Invasive	1900 - 1984	0	1220,36	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHL
Chile	Invasive	1985 - 1994	0	2522,16	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHL
Chile	Invasive	1995 - 2004	2	5145,17	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHL
Chile	Invasive	2005 - 2014	4	12050,28	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHL
Chile	Invasive	2015 - 2024	16	15062,31	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHL
China	Invasive	1900 - 1984	0	140,6	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHN
China	Invasive	1985 - 1994	0	330,02	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHN
China	Invasive	1995 - 2004	0	986,51	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHN
China	Invasive	2005 - 2014	0	4572,95	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHN
China	Invasive	2015 - 2024	3	10857,83	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHN

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Curazao	Invasive	1900 - 1984	0	NA	Alternativa: Central Bureau of Statistics Curaçao
Curazao	Invasive	1985 - 1994	0	NA	Alternativa: Central Bureau of Statistics Curaçao
Curazao	Invasive	1995 - 2004	0	NA	Alternativa: Central Bureau of Statistics Curaçao
Curazao	Invasive	2005 - 2014	0	NA	Alternativa: Central Bureau of Statistics Curaçao
Curazao	Invasive	2015 - 2024	1	NA	Alternativa: Central Bureau of Statistics Curaçao
Cyprus	Invasive	1900 - 1984	0	2883,65	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CYP
Cyprus	Invasive	1985 - 1994	0	8529,76	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CYP
Cyprus	Invasive	1995 - 2004	1	16436,35	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CYP
Cyprus	Invasive	2005 - 2014	0	29819,17	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CYP
Cyprus	Invasive	2015 - 2024	0	30568,55	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CYP
Czech Republic	Invasive	1900 - 1984	0	NA	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CZE
Czech Republic	Invasive	1985 - 1994	0	3786,12	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CZE
Czech Republic	Invasive	1995 - 2004	0	7388,04	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CZE
Czech Republic	Invasive	2005 - 2014	0	19226,88	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CZE
Czech Republic	Invasive	2015 - 2024	1	24811,67	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CZE
England	Invasive	1900 - 1984	0	4215,93	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GBR
England	Invasive	1985 - 1994	1	16219	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GBR

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England	Invasive	1995 - 2004	1	29245,28	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GBR
England	Invasive	2005 - 2014	2	43819,96	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GBR
England	Invasive	2015 - 2024	7	44794,26	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GBR
Espana	Invasive	1900 - 1984	0	2508,74	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ESP
Espana	Invasive	1985 - 1994	11	11124,25	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ESP
Espana	Invasive	1995 - 2004	26	17104,38	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ESP
Espana	Invasive	2005 - 2014	38	30528,41	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ESP
Espana	Invasive	2015 - 2024	50	29861,8	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ESP
France	Invasive	1900 - 1984	0	5347,06	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=FRA
France	Invasive	1985 - 1994	0	18666,11	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=FRA
France	Invasive	1995 - 2004	0	25910,6	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=FRA
France	Invasive	2005 - 2014	2	41111,24	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=FRA
France	Invasive	2015 - 2024	4	40905,95	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=FRA
Germany	Invasive	1900 - 1984	0	5220,2	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=DEU
Germany	Invasive	1985 - 1994	1	20074,78	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=DEU
Germany	Invasive	1995 - 2004	0	28232,41	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=DEU
Germany	Invasive	2005 - 2014	0	43427,24	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=DEU

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Germany	Invasive	2015 - 2024	1	48596,95	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=DEU
Greece	Invasive	1900 - 1984	0	2626,35	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GRC
Greece	Invasive	1985 - 1994	0	8375,67	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GRC
Greece	Invasive	1995 - 2004	0	14204,03	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GRC
Greece	Invasive	2005 - 2014	1	25286,25	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GRC
Greece	Invasive	2015 - 2024	1	20140,68	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GRC
Holland	Invasive	1900 - 1984	0	5827,66	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NLD
Holland	Invasive	1985 - 1994	0	19053,76	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NLD
Holland	Invasive	1995 - 2004	0	30048,83	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NLD
Holland	Invasive	2005 - 2014	3	51334,94	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NLD
Holland	Invasive	2015 - 2024	5	55515	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NLD
Islas caiman	Invasive	1900 - 1984	0	NA	Alternativa: Cayman Islands Economics & Statistics Office
Islas caiman	Invasive	1985 - 1994	0	NA	Alternativa: Cayman Islands Economics & Statistics Office
Islas caiman	Invasive	1995 - 2004	6	NA	Alternativa: Cayman Islands Economics & Statistics Office
Islas caiman	Invasive	2005 - 2014	7	NA	Alternativa: Cayman Islands Economics & Statistics Office
Islas caiman	Invasive	2015 - 2024	5	NA	Alternativa: Cayman Islands Economics & Statistics Office
Israel	Invasive	1900 - 1984	0	3771,19	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ISR

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Israel	Invasive	1985 - 1994	3	12362,83	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ISR
Israel	Invasive	1995 - 2004	0	20169,23	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ISR
Israel	Invasive	2005 - 2014	5	30297,37	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ISR
Israel	Invasive	2015 - 2024	9	45961,29	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ISR
Italy	Invasive	1900 - 1984	0	3675,74	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ITA
Italy	Invasive	1985 - 1994	0	17016,52	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ITA
Italy	Invasive	1995 - 2004	5	23227,19	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ITA
Italy	Invasive	2005 - 2014	5	36222,79	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ITA
Italy	Invasive	2015 - 2024	12	34748,19	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ITA
Jordan	Invasive	1900 - 1984	0	985,89	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JOR
Jordan	Invasive	1985 - 1994	0	1564,17	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JOR
Jordan	Invasive	1995 - 2004	0	1596,34	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JOR
Jordan	Invasive	2005 - 2014	0	3395,14	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JOR
Jordan	Invasive	2015 - 2024	1	4203,26	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JOR
Kuwait	Invasive	1900 - 1984	0	8612,68	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KWT
Kuwait	Invasive	1985 - 1994	0	11242,94	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KWT
Kuwait	Invasive	1995 - 2004	0	18669,35	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KWT

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Kuwait	Invasive	2005 - 2014	0	45282,79	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KWT
Kuwait	Invasive	2015 - 2024	1	31555,56	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KWT
Maldives	Invasive	1900 - 1984	0	239,98	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MDV
Maldives	Invasive	1985 - 1994	0	969,25	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MDV
Maldives	Invasive	1995 - 2004	0	2521,69	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MDV
Maldives	Invasive	2005 - 2014	0	6729,96	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MDV
Maldives	Invasive	2015 - 2024	2	10836,78	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MDV
Mexico	Invasive	1900 - 1984	0	1262,36	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MEX
Mexico	Invasive	1985 - 1994	0	3458,54	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MEX
Mexico	Invasive	1995 - 2004	0	6550,18	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MEX
Mexico	Invasive	2005 - 2014	27	10101,17	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MEX
Mexico	Invasive	2015 - 2024	60	10776,43	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MEX
Morocco	Invasive	1900 - 1984	0	452,21	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MAR
Morocco	Invasive	1985 - 1994	1	1107,68	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MAR
Morocco	Invasive	1995 - 2004	0	1652,09	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MAR
Morocco	Invasive	2005 - 2014	1	3008,88	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MAR
Morocco	Invasive	2015 - 2024	4	3486,76	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MAR

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Palestine	Invasive	1900 - 1984	0	NA	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PSE
Palestine	Invasive	1985 - 1994	1	1201,58	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PSE
Palestine	Invasive	1995 - 2004	0	1364,56	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PSE
Palestine	Invasive	2005 - 2014	0	2417,78	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PSE
Palestine	Invasive	2015 - 2024	3	3439,88	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PSE
Panama	Invasive	1900 - 1984	0	1332,8	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PAN
Panama	Invasive	1985 - 1994	0	2937,58	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PAN
Panama	Invasive	1995 - 2004	0	3909,29	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PAN
Panama	Invasive	2005 - 2014	0	8655,39	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PAN
Panama	Invasive	2015 - 2024	1	16116,09	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PAN
Paraguay	Native	1900 - 1984	2	625,26	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRY
Paraguay	Native	1985 - 1994	6	1359,04	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRY
Paraguay	Native	1995 - 2004	12	1777,34	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRY
Paraguay	Native	2005 - 2014	10	4523,55	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRY
Paraguay	Native	2015 - 2024	14	6015,05	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRY
Peru	Invasive	1900 - 1984	0	697,01	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PER
Peru	Invasive	1985 - 1994	0	1308,61	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PER

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Peru	Invasive	1995 - 2004	0	2119,91	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PER
Peru	Invasive	2005 - 2014	1	4866,29	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PER
Peru	Invasive	2015 - 2024	0	6985,05	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PER
Poland	Invasive	1900 - 1984	0	NA	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=POL
Poland	Invasive	1985 - 1994	0	2359,55	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=POL
Poland	Invasive	1995 - 2004	0	4814,24	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=POL
Poland	Invasive	2005 - 2014	0	12139,72	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=POL
Poland	Invasive	2015 - 2024	1	17139,32	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=POL
Portugal	Invasive	1900 - 1984	0	1573,43	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRT
Portugal	Invasive	1985 - 1994	0	7021,72	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRT
Portugal	Invasive	1995 - 2004	2	13027,62	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRT
Portugal	Invasive	2005 - 2014	3	21972	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRT
Portugal	Invasive	2015 - 2024	3	23538,51	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PRT
Puerto Rico	Invasive	1900 - 1984	1	NA	Alternativa sugerida: Puerto Rico Planning Board / IMF
Puerto Rico	Invasive	1985 - 1994	7	NA	Alternativa sugerida: Puerto Rico Planning Board / IMF
Puerto Rico	Invasive	1995 - 2004	21	NA	Alternativa sugerida: Puerto Rico Planning Board / IMF
Puerto Rico	Invasive	2005 - 2014	28	28479,7	Alternativa sugerida: Puerto Rico Planning Board / IMF

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Puerto Rico	Invasive	2015 - 2024	59	32847,5	Alternativa sugerida: Puerto Rico Planning Board / IMF
Romania	Invasive	1900 - 1984	0	NA	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ROU
Romania	Invasive	1985 - 1994	0	1460,95	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ROU
Romania	Invasive	1995 - 2004	0	2009,22	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ROU
Romania	Invasive	2005 - 2014	0	8413,91	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ROU
Romania	Invasive	2015 - 2024	1	13670,75	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ROU
Singapore	Invasive	1900 - 1984	0	2340,76	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SGP
Singapore	Invasive	1985 - 1994	0	12299,26	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SGP
Singapore	Invasive	1995 - 2004	0	24020,04	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SGP
Singapore	Invasive	2005 - 2014	1	45330,6	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SGP
Singapore	Invasive	2015 - 2024	1	71457,27	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SGP
Switzerland	Invasive	1900 - 1984	0	8672,81	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHE
Switzerland	Invasive	1985 - 1994	0	33821,32	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHE
Switzerland	Invasive	1995 - 2004	0	44912,49	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHE
Switzerland	Invasive	2005 - 2014	1	75486,02	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHE
Switzerland	Invasive	2015 - 2024	0	89581,19	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CHE
Taiwan	Invasive	1900 - 1984	0	NA	Alternativa: IMF / Our World in Data (Taiwan)

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Taiwan	Invasive	1985 - 1994	0	NA	Alternativa: IMF / Our World in Data (Taiwan)
Taiwan	Invasive	1995 - 2004	0	NA	Alternativa: IMF / Our World in Data (Taiwan)
Taiwan	Invasive	2005 - 2014	1	NA	Alternativa: IMF / Our World in Data (Taiwan)
Taiwan	Invasive	2015 - 2024	4	NA	Alternativa: IMF / Our World in Data (Taiwan)
Thailand	Invasive	1900 - 1984	0	358	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=THA
Thailand	Invasive	1985 - 1994	0	1515,15	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=THA
Thailand	Invasive	1995 - 2004	0	2324,79	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=THA
Thailand	Invasive	2005 - 2014	0	4645,44	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=THA
Thailand	Invasive	2015 - 2024	1	6813,34	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=THA
USA	Invasive	1900 - 1984	57	7635,79	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=USA
USA	Invasive	1985 - 1994	66	22935,32	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=USA
USA	Invasive	1995 - 2004	64	35016,3	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=USA
USA	Invasive	2005 - 2014	68	49306,73	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=USA
USA	Invasive	2015 - 2024	69	68466,18	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=USA
United Arab Emirates	Invasive	1900 - 1984	0	26250,68	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARE
United Arab Emirates	Invasive	1985 - 1994	0	24900,33	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARE
United Arab Emirates	Invasive	1995 - 2004	0	28245,5	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARE

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United Arab Emirates	Invasive	2005-2014	3	46669,9	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARE
United Arab Emirates	Invasive	2015-2024	3	44599,45	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ARE
Uruguay	Native	1900-1984	0	1333,26	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=URY
Uruguay	Native	1985-1994	3	3228,11	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=URY
Uruguay	Native	1995-2004	12	6045,27	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=URY
Uruguay	Native	2005-2014	13	11850,36	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=URY
Uruguay	Native	2015-2024	16	19226,99	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=URY

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