Update on the distribution of some breeding bird species in western Sicily

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Abstract - This work reports the distribution of some breeding bird species of interest (conservation status, limited distribution or density in Sicily/Italy, etc.) in the province of Trapani (Western Sicily, Italy), updating the latest Sicilian and Italian atlases of breeding birds. We report data on breeding bird species obtained in the period 2017 – 2024 and not mapped as nesting in the province of Trapani in the above-mentioned atlases, along with species for which our data significantly adds to that reported therein. We update the distribution of 24 species and estimate their breeding population where possible. *Ornitho.it* is now the standard accepted by the Italian ornithological community for the collection and editing of atlases. While this platform plays a commendable role in data collection in regions with a high number of observers, this does not apply to understudied or under-represented areas such as Sicily. This work publishes useful data to develop maps that better represent the true distribution of a number of species.

Key words: distribution updating in Western Sicily, Red-crested Pochard, Common Pochard, Calandra and Short-toed Larks.

Riassunto - Distribuzione aggiornata di alcune specie di uccelli nidificanti nella Sicilia occidentale.

Questo lavoro riporta la distribuzione di alcune specie di uccelli nidificanti di interesse (per stato di conservazione, distribuzione o densità limitata in Sicilia/Italia, ecc.) nella provincia di Trapani (Sicilia occidentale, Italia), aggiornando gli ultimi Atlanti siciliani e italiani degli uccelli nidificanti. Vengono riportati i dati relativi alle specie di uccelli nidificanti più rilevanti, ottenuti nel periodo 2017-2024, che non erano elencate come nidificanti nella provincia di Trapani negli Atlanti menzionati, o quelle specie che, sebbene già segnalate, hanno subito una variazione significativa nella loro distribuzione. I dati presentati forniscono un aggiornamento sulla distribuzione di 24 specie, con, ove disponibile, una stima delle coppie nidificanti rinvenute. Ornitho.it è ormai lo standard accettato dalla comunità ornitologica italiana per la raccolta e la redazione di atlanti. Sebbene questa piattaforma svolga un ruolo encomiabile nella raccolta dati in regioni con un elevato numero di osservatori, ciò non si applica ad aree poco studiate o sottorappresentate, come la Sicilia. Questo lavoro pubblica dati utili per sviluppare mappe che rappresentino meglio la reale diffusione di alcune specie selezionate.

Parole chiave: aggiornamento distribuzione Sicilia occidentale, Fistione turco, Moriglione, Calandra, Calandrella.

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INTRODUCTION

Ornithological atlases map the breeding distribution of various species in a large area and in a specific period and are a highly suitable technical/scientific tool to provide an updated picture of the status and distribution of bird species; their regular updating is therefore essential (Sorace *et al*., 2017; Knaus *et al*., 2018). The distribution of birds is subject to frequent changes, such that it must be continuously monitored and mapped. Several recent works have updated the distribution of breeding birds in Sicily (Surdo & Matteucci, 2016; Surdo *et al.*, 2018; Surdo, 2019; Zafarana *et al*., 2020; Galasso *et al*., 2021; La Mantia *et al*., 2021; Surdo *et al.*, 2021, Rannisi *et al*., 2024; Surdo *et al*., 2023; Surdo *et al*., 2024). The island's rich avifauna remains to be fully explored, and the status and distribution of a number of species still need to be investigated in depth. Although the province of Trapani has undergone strong landscape and environmental changes in recent decades, it retains high environmental and naturalistic value. In light of these changes, it is necessary to update the knowledge on the distribution of some species of birds nesting in the province. To this end, we provide updated distribution maps of 24 species.

MATERIALS AND METHODS

Between 2017 and 2024, the authors collected extensive data during environmental monitoring projects and focused ornithological studies, based on point counts and line transects, specific research, and occasional observations in the UTM quadrants shown in the map (Fig. 1). Point counts and line transects regarded mostly passerines, while most of the data regarding waterbirds are based on occasional observations. For raptor species and for some endangered *Charadriiformes*, data were collected systematically throughout the study area through specific targeted research. Only confirmed breeding records are shown on the maps (code 11 to 19 in Ornitho.it), omitting possible or probable breeding records data. We compared our data with those in the latest Sicilian Atlas (AA.VV., 2008) and the latest Atlas of breed-

ing birds in Italy (Lardelli *et al*., 2022). The latest update on our study area was Surdo (2019).

The systematic order and the scientific nomenclature follow the latest official Italian checklist (Baccetti *et al*., 2021).

Legend for the distribution maps

Yellow = square with confirmed breeding records from both previous works (mentioned in the text) and from this study.

Green = square with confirmed breeding records only from this study (2017-2024).

Red = square with confirmed breeding in one or both of the previous works but not reconfirmed during this study.

Red-crested Pochard *Netta rufina* (Fig. 2)

Considered a scarce breeder before the 20th century in Sicily (Massa *et al*., 2021), the latest breeding record was reported from the 1940s, in the wetland of "Biviere di Lentini" (Iapichino & Massa, 1989). Subsequently, the species was extirpated as a breeder in the region (Corso, 2005; Massa *et al*., 2021) until the 21st century, when two confirmed breeding records were published: i) a female with ducklings observed in May-June 2004 at "Pantano Leone" (TP) (Sciabica, 2004), and ii) a female with four ducklings in July 2021 at "Pantano Longarini" (SR) (Galasso & Romano, 2021). Additional and previously unpublished records include two pairs regularly observed at Lago Preola and Gorghi Tondi in the period March 2010-May 2012 (Lucio Maniscalco, Andrea Volpe, Antonino Di Lucia, pers. comm.). Starting in 2016 nesting was confirmed here on numerous occasions: 1 pair with 2 recently fledged juveniles in August 2016 (ACO & Verena Penna, *pers. obs*); 12 individuals (7 recently fledged juveniles) in September 2018 and 6 (1 pair with 4 juveniles) in September 2019 (ACO, B.J. Small & C. Bushell, pers. obs.); 1 female with 2 downy young in June 2019 (ACO & Verena Penna, pers. obs.); 1 male, 2 female and 6 recently fledged juveniles in May 2022 (ACO, AS, MV, pers. obs.); 1 juv. recently fledged at Pantano Leone (Campobello di Mazara) on 11/09/2024, likely born at the nearby Lago Preola (AC). In eastern Sicily, since 2021, it breeds regularly with 1-3 pairs at Longarini and Cuba coastal wetlands (Galasso & Romano, 2021; ACO, pers. obs.; Paolo Galasso, pers. comm.). The species has become a regular breeder here in the last 10 years, albeit a very small number of pairs, and with breeding success strongly influenced by local water levels.

Common Pochard *Aythya ferina* (Fig. 3)

The Common Pochard began to breed in Sicily in 1982 (Dimarca & Falci, 1983) and is generally considered a rare breeder (Massa, 1985; Corso, 2005; Massa *et al*., 2021), usually in central and eastern Sicily. SS and AC documented the first breeding record in Trapani province on 11/06/24, with at least 12 pairs and 33 chicks at Lago Preola and Gorghi Tondi. Observations in August-September of mixed flocks of adults and juveniles here since 2016 indicate that the species was most likely already breeding there. The species is increasing in Italy both in the extent of its breeding range and in the number of pairs (Verza, 2022). Lago Preola hosts a significant share (about 4%) of the estimated Italian breeding population of 280-380 pairs (Brichetti & Fracasso 2018), mandating careful monitoring in the coming years.

Mallard *Anas platyrhynchos* (Fig. 4)

According to Sgorlon (2022), the Mallard, although widespread in northern Italy and Sardinia, is decreasing in central Italy and especially in southern Italy and Sicily. In fact, published data (Corso, 2005; AA.VV., 2008) and recent unpublished data (various observers) show a clear increase of the species throughout Sicily, including in the west of the island. Here, it was formerly a very rare breeding species (D'Angelo & Guadagna, 1994), but has significantly increased in recent years (Surdo *et al*., 2017).

Great Crested Grebe *Podiceps cristatus* (Fig. 5)

Generic data on Great Crested Grebe nesting in Sicily are available for 1940-1960 (Corso, 2005), after which this species was not thought to nest in Sicily until 1984, when nesting was reconfirmed (Ciaccio & Siracusa, 1985, 1987). Since then, it began to colonize various lakes, especially in the central-eastern sector of the region (Corso, 2005; Gargioni, 2022). The expansion and increase in the number of pairs in southern Italy and Sicily seem to be facilitated by the creation of artificial basins (Brichetti & Grattini, 2007; Brichetti & Fracasso, 2018).

Purple Swamphen *Porphyrio porphyrio* (Fig. 6)

It is apparently increasing as a breeding (given the number of newly occupied distribution squares), probably due to the increasing number of artificial irrigation basins with dense shoreline vegetation in the last 20 years. However, breeding has been irregular or occasional at all sites except for Lago Preola Nature Reserve, where the Purple Swamphen has bred regularly since 2006. Only 2 pairs were recorded in 2024 at the Trapani salt pans (TC80) in the Baiata canal (SS). Previously, only one record of 2 birds, dating back to 1969, was known for the Trapani and Paceco saltpans (Surdo, 2018). The nesting of two pairs at Diga Zaffarana (TB99) was recorded only in 2023 (SS), while the following year, the species was not observed due to the drought. Single nesting records were recorded at a pond near Trinità dam in 2022 (SS & Antonino Barbera, pers. obs.) and at the Trinità dam in 2024 (AC).

Little Ringed Plover *Charadrius dubius* (Fig. 7)

A declining species in Sicily and Sardinia (Biondi, 2022), breeding records in new quadrants (n.°10) in our study area seem to indicate instead a moderate positive trend; however, it is unclear whether this data is attributable to greater ornithological coverage in recent years or to a real increase. More common during migration (especially the post-breeding one), it occasionally winters with a few individuals. Biondi *et al*. (2000) reported 3 pairs at the Trapani salt pans, where it is now only an occasional breeder. Elsewhere in Sicily, the species shows a fluctuating number of breeding pairs, probably generally declining, but with an increasing number of birds observed during the post-breeding migration (Corso, 2005; ACO, pers. obs.).

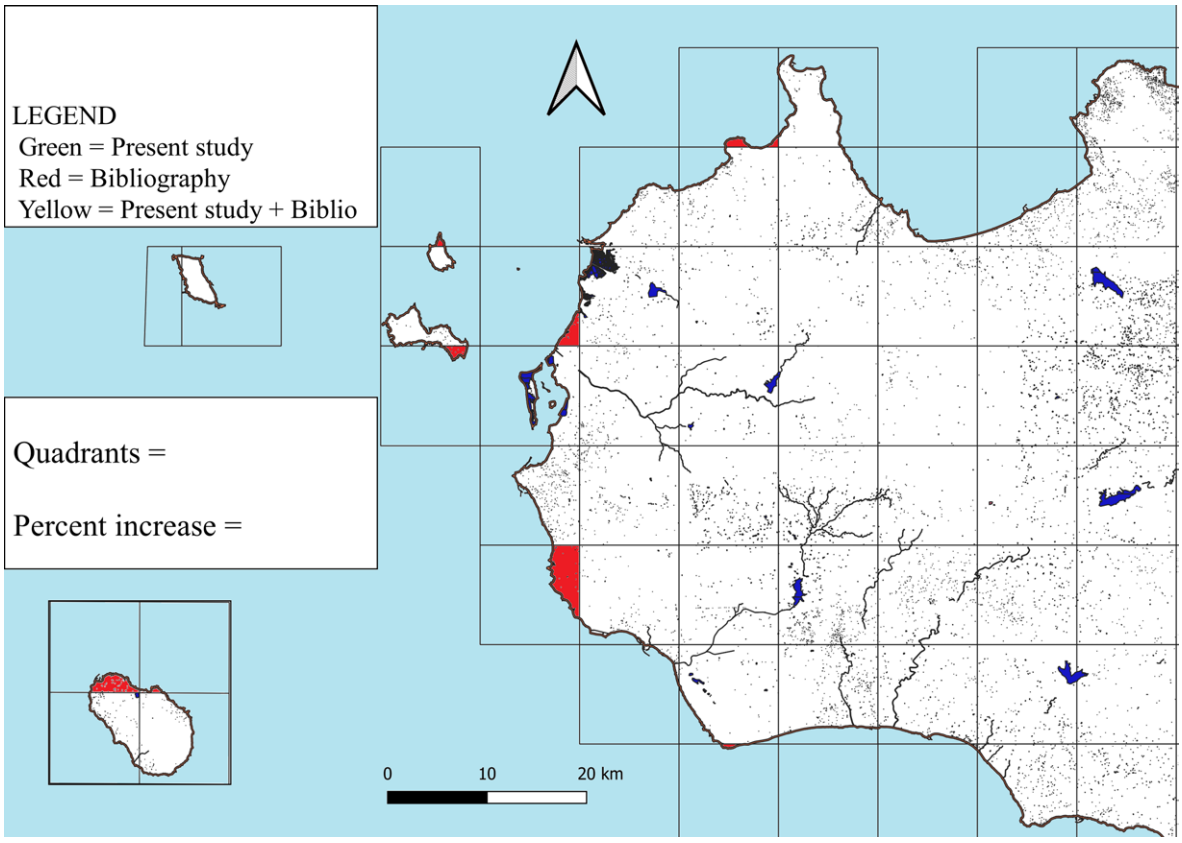

Fig. 1 – Map of the study area; data from the quadrants in red were combined with the adjacent quadrant. / Mappa dell'area di studio, mostrante in rosso i quadranti che sono stati accorpati al quadrante adiacente, data la modesta porzione di terre emerse.

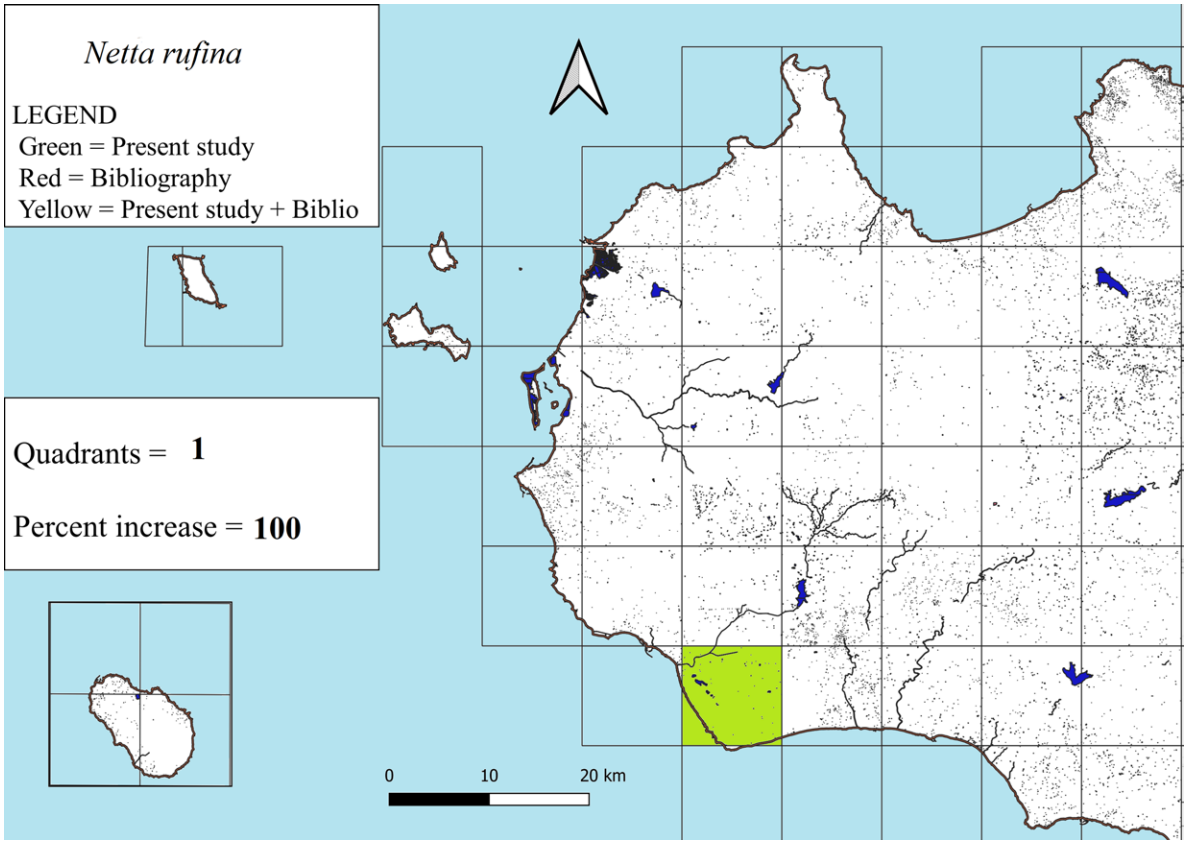

Fig. 2 – Distribution of Red-crested Pochard *Netta rufina* in the study area. / Distribuzione del Fistione turco *Netta rufina* nell'area di studio.

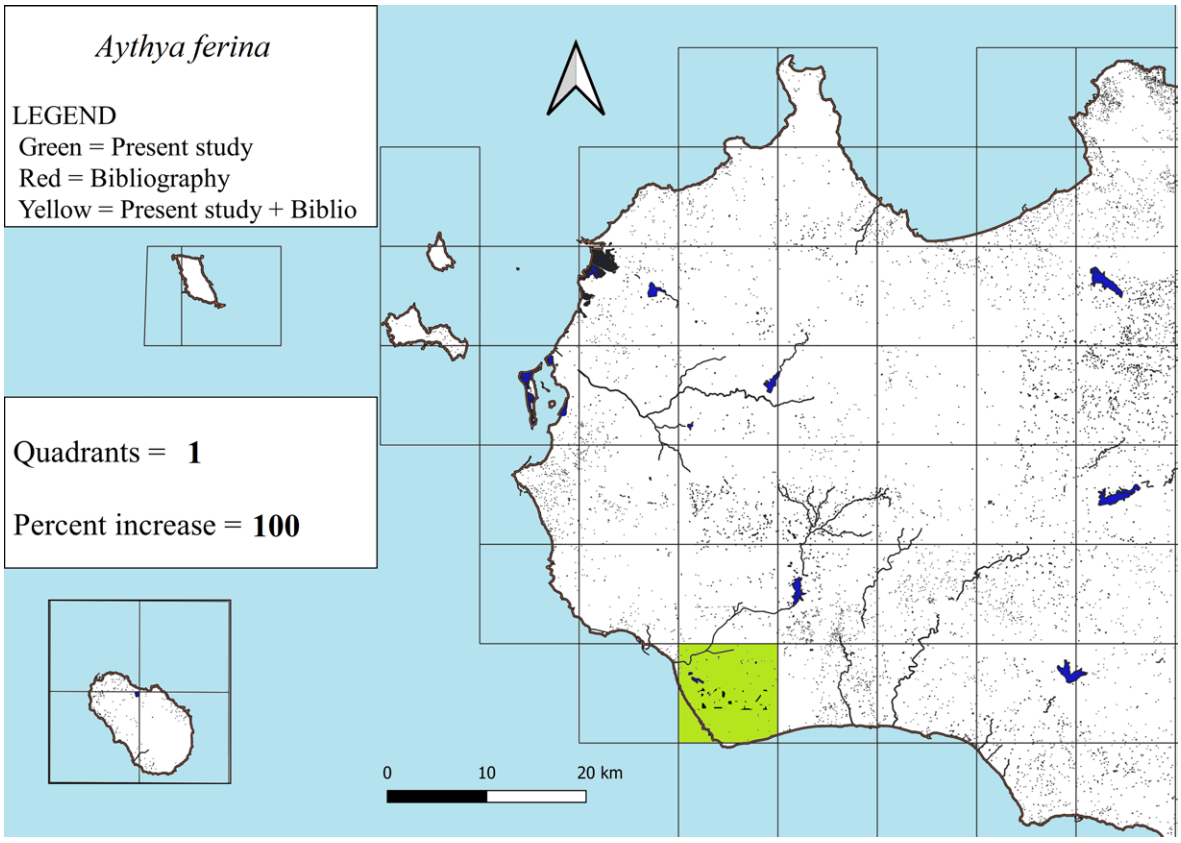

Fig. 3 – Distribution of Common Pochard *Aythya ferina* in the study area. / Distribuzione del Moriglione *Aythya ferina* nell'area di studio.

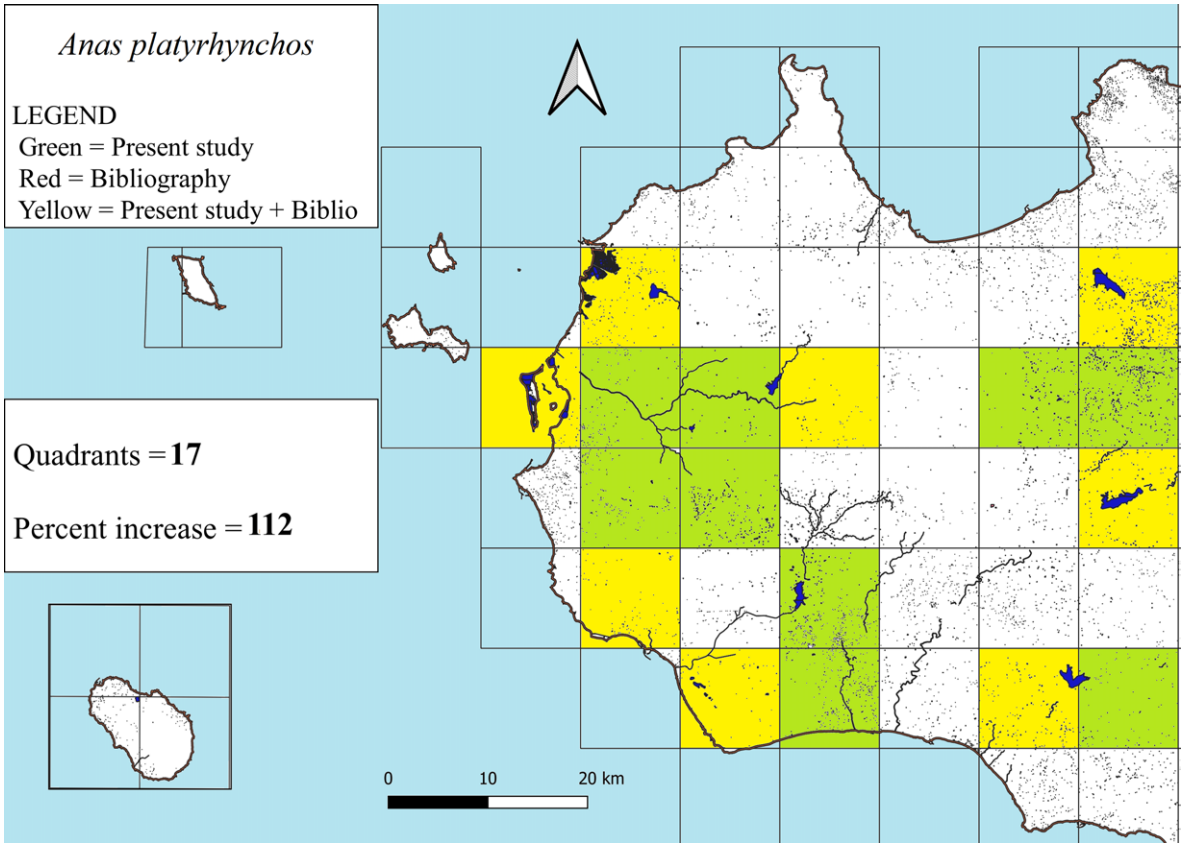

Fig. 4 – Distribution of Mallard *Anas platyrhynchos* in the study area. / Distribuzione del Germano reale *Anas platyrhynchos* nell'area di studio.

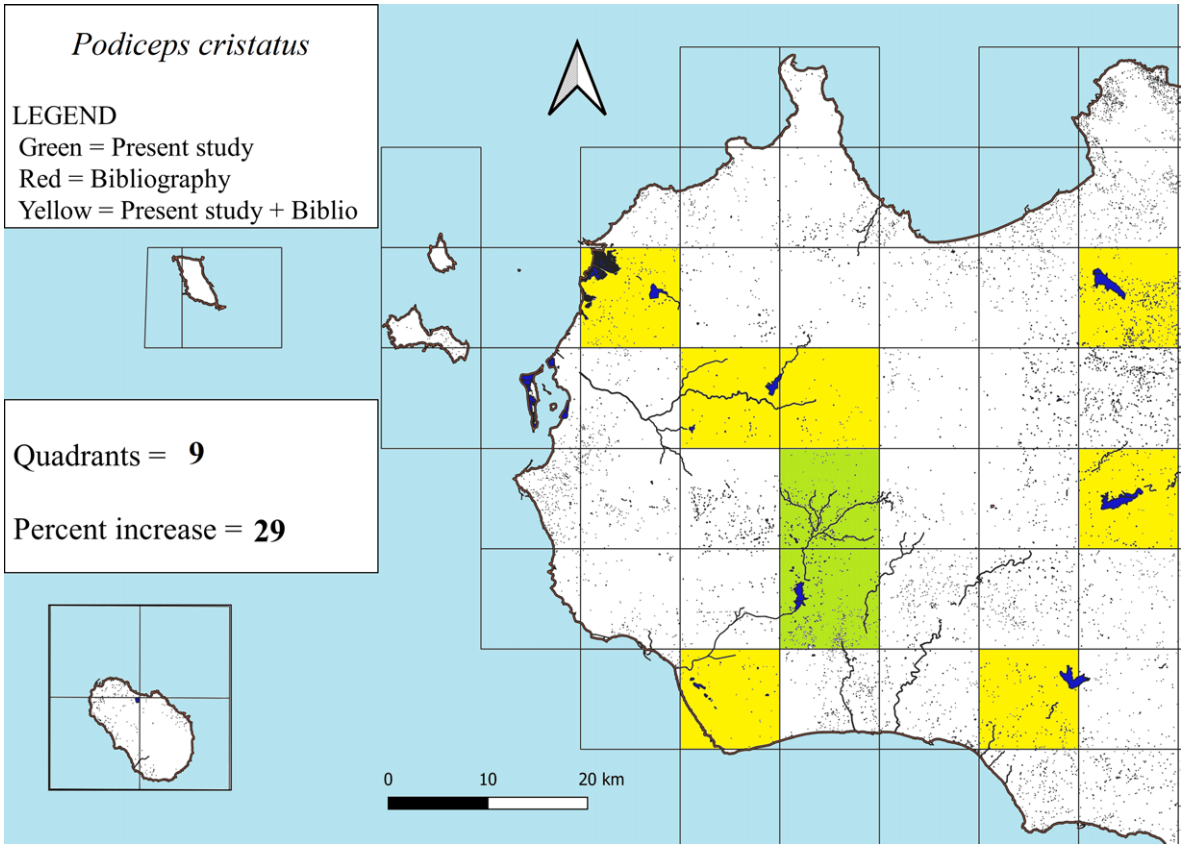

Fig. 5 – Distribution of Great Crested Grebe *Podiceps cristatus* in the study area. / Distribuzione dello Svasso maggiore *Podiceps cristatus* nell'area di studio.

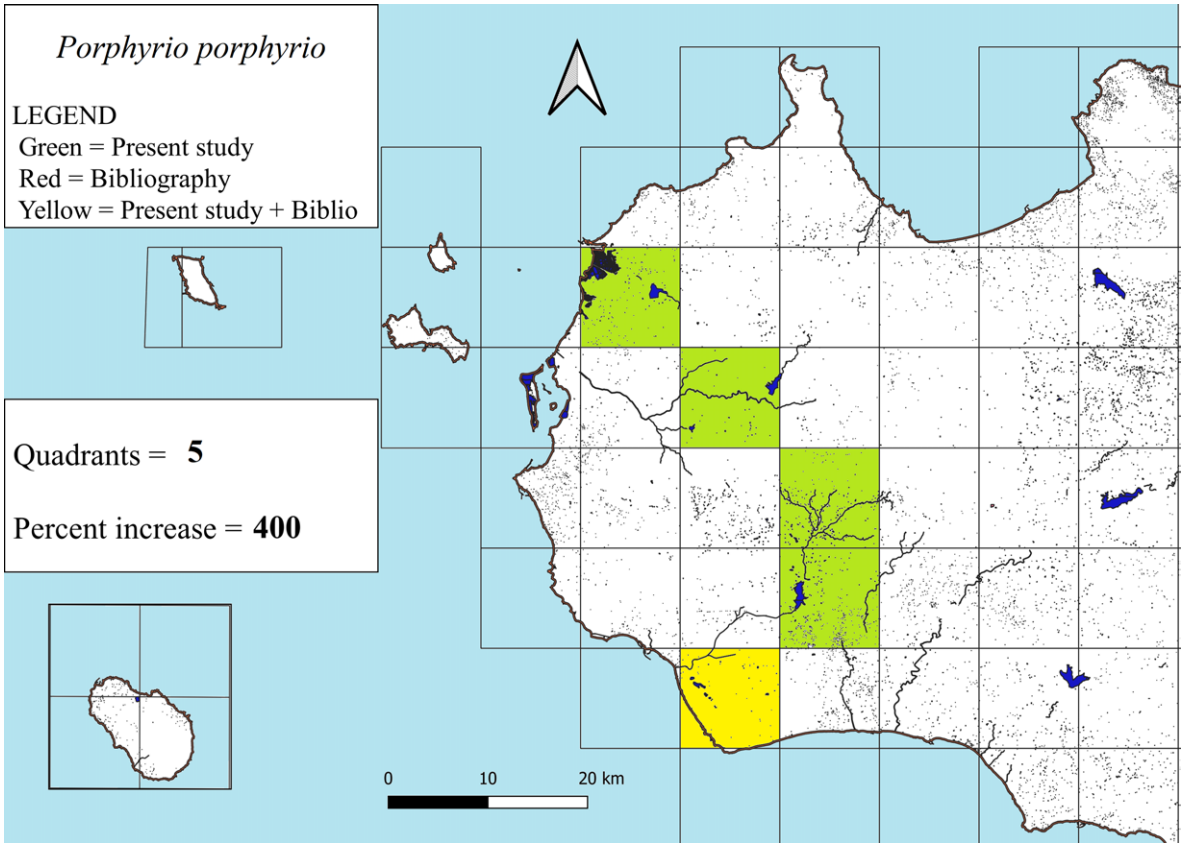

Fig. 6 – Distribution of Purple Swamphen *Porphyrio porphyrio* in the study area. / Distribuzione del Pollo sultano *Porphyrio porphyrio* nell'area di studio.

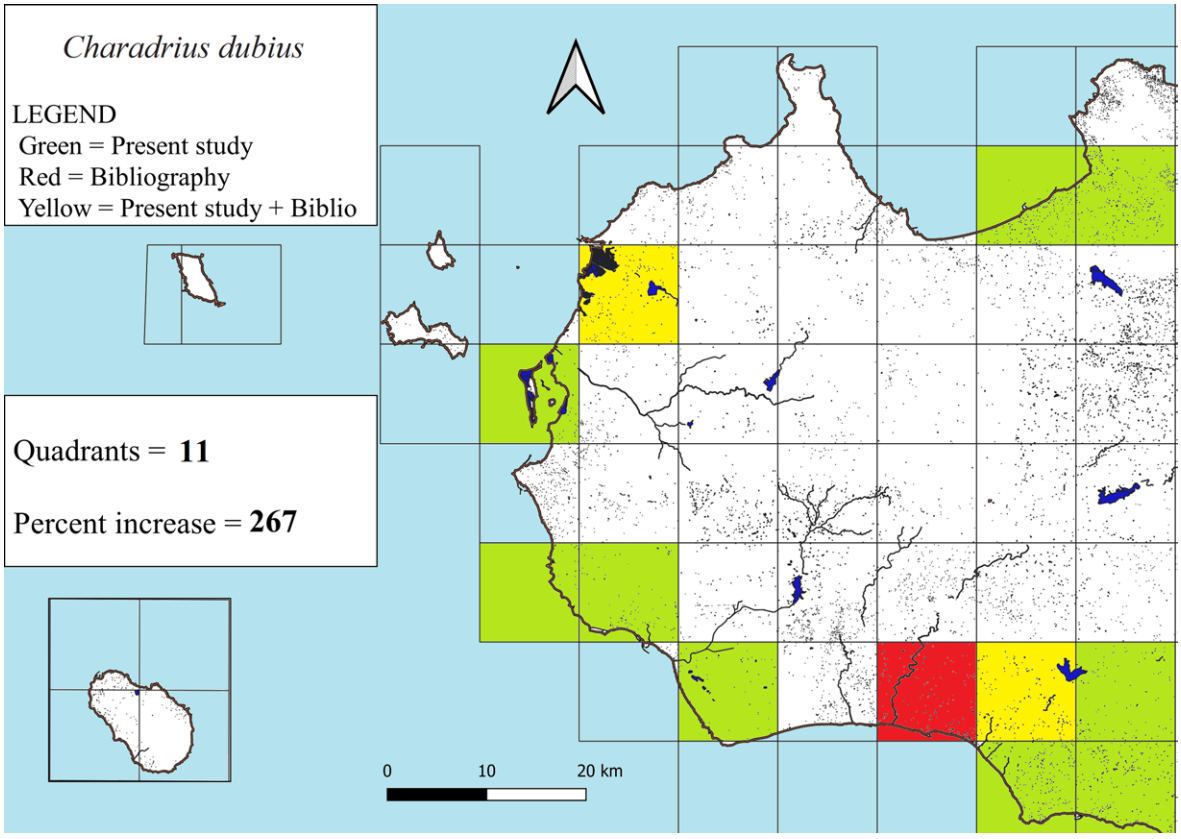

Fig. 7 – Distribution of Little Ringed Plover *Charadrius dubius* in the study area. / Distribuzione del Corriere piccolo *Charadrius dubius* nell'area di studio.

Kentish Plover *Charadrius alexandrines* (Fig. 8)

One of the most endangered breeding *Charadriformes* in Italy (Biondi & Pietrelli, 2011; Biondi & Tinarelli, 2022), its population in Sicily has fluctuated until around 2005 (Corso, 2005), with a general strong decrease in recent years (Ientile, 2011; Galasso *et al*., 2022). In western Sicily (Surdo & Matteucci, 2016; Galasso *et al*., 2022), this decrease was estimated at -70% of the population compared to the 1970s. As population trends strongly depend on water levels in coastal wetlands (as much as for Little Tern and several other waterbirds) and are highly impacted by human disturbance, breeding numbers have fluctuated in recent years, with a positive trend in some localities. In the study area, close monitoring of the breeding population in spring-summer 2023 at the wetlands of Capo Feto and Margi Spanò (Petrosino, Mazara del Vallo), where Galasso *et al*. (2022) reported up to 23 pairs, resulted in finding 40 breeding pairs with either eggs or chicks, plus an additional 10 possible pairs (Corso, 2023; ACO, AS, MV, pers. obs.). Indeed, the water level during the breeding season 2023 was at its most favorable for many years; in 2024, the water level was lower and less favorable for breeding, and the number of breeding pairs dropped to about 15-20. At Punta d'Alga (Marsala), where Galasso *et al*. (2022) reported 2-4 pairs, 15 breeding pairs were recorded in 2023, with about 8-10 in 2024 (ACO, AS, MV, AC & Danilo Graffeo, pers. obs.).

Common Redshank *Tringa tetanus* (Fig. 9)

Breeding was confirmed for the first time in Sicily on 15/06/2002 at the Saline di Punta Cugno, Augusta (SR), with 2 pairs with 2 chicks each (Corso, 2005). Following this observation, the species has nested at this site almost every year, with 1-3 pairs until 2019, showing a strong dependence on spring and summer water levels; however, it apparently deserted the area in the period 2020-2025 (ACO, pers. obs.). Scarton (2022) reported a single breeding record for this site: 2 pairs with chicks on 01/06/2012. The species is reported as an occasional breeder for Sicily for the period 2010-2020 (Massa *et al*., 2021). At the Trapani saltpans, probable breeding in 2001 and 2002 was reported (Corso, 2005; Brichetti & Fracasso, 2004). It nested at Capo Feto in 2017 (Sciabica, 2017) and also in 2018 and 2023 with at least 1 pair (ACO, AS, AC & MV, pers. obs.) and at the nearby Tonnarella lagoon in 2024 (Vincenzo Sciabica, pers. comm.). It also nested with at least 1 pair at Punta dell'Alga (Marsala) in 2022-2025 (ACO, AC & Danilo Graffeo, pers. obs.). In the last 10 years, it has gone from a very occasional to an irregular breeder in Sicily, strongly linked to water levels in the coastal wetlands, and to various disturbance factors, both anthropic and non-anthropic (e.g., presence of stray dogs) (Pienkowski, 1993).

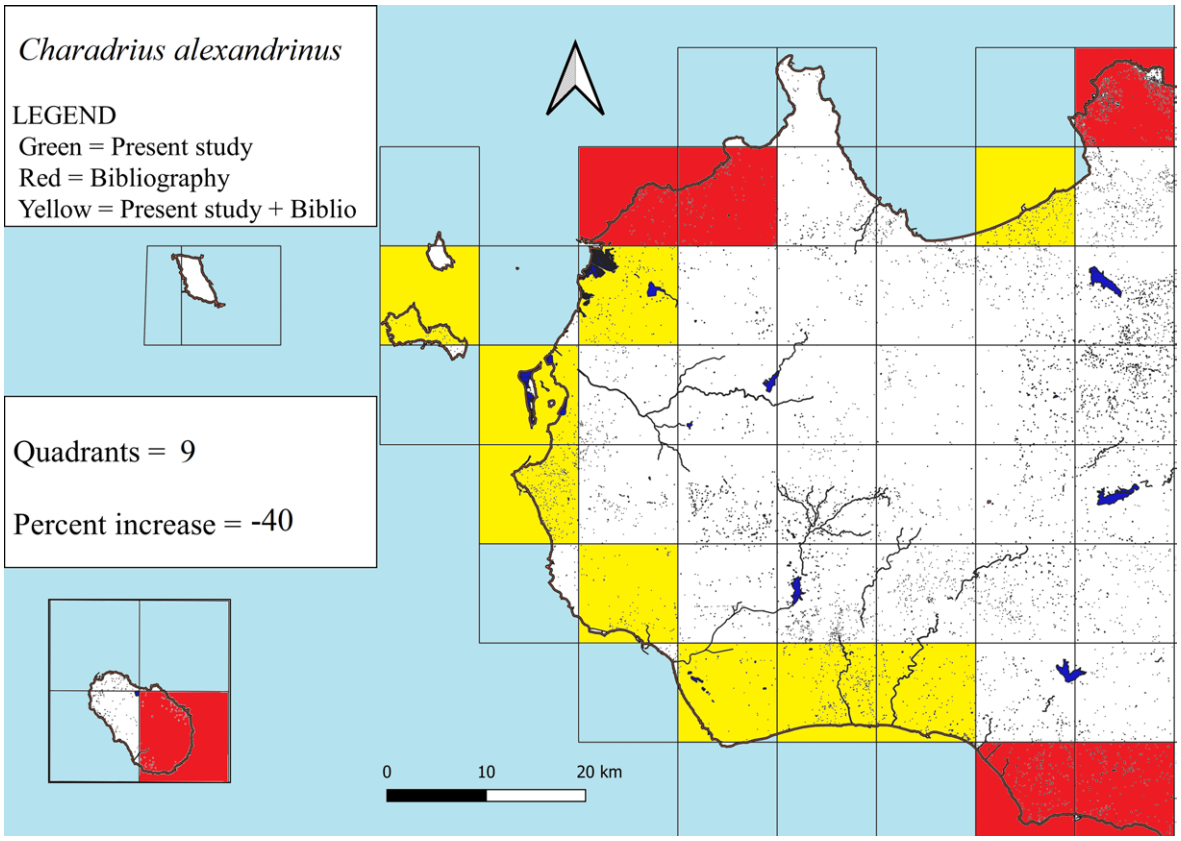

Fig. 8 – Distribution of Kentish Plover *Charadrius alexandrinus* in the study area. / Distribuzione del Fratino *Charadrius alexandrinus* nell'area di studio.

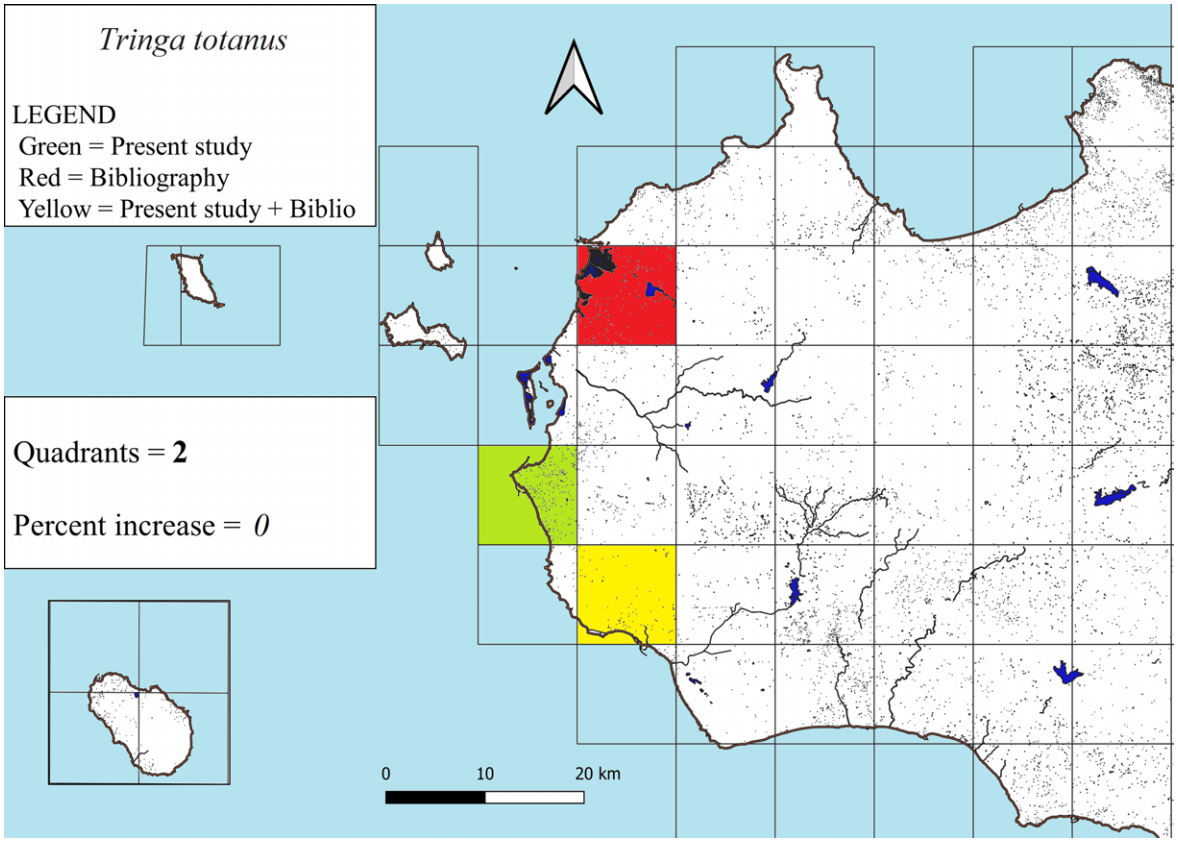

Fig. 9 – Distribution of Common Redshank *Tringa totanus* in the study area. / Distribuzione della Pettegola *Tringa totanus* nell'area di studio.

Stone Curlew *Burhinus oedicnemus* (Fig. 10)

Certainly, the *Charadriiformes* with the most evident rate of increase both in terms of distribution across the regional territory and in the size of the breeding population are also among the most successful bird species in general in Sicily (Surdo *et al*., 2023; ACO, AS, MV, pers. obs.). A clear increase was also recorded in the province of Trapani, where, compared to the findings of Surdo *et al.* (2023), extensive night-time monitoring led to the addition of 14 squares, thus showing that the species is present throughout the province. Birdlife International (2017) provides an estimate of 3600-6600 pairs for Italy, more than double that reported by Tinarelli *et al*. (2009). In the environmental suitability map reported in Giunchi & Meschini (2022), the entire area covered by this study is highly suitable for the Stone Curlew; our study thus confirms the validity of the model.

Northern Long-eared Owl *Asio otus* (Fig. 11)

Considered a very scarce and localized breeder by Corso (2005), with 5-6 localities and a breeding population of about 20-30 pairs, a much more extensive population was then reported by AA.VV. (2008) with no less of 28 distribution squares (10km) for the whole of Sicily (but only a single one for Western Sicily). Reported as a breeding species on Pantelleria for the first time by Corso *et al*. (2012) and Corso & Gustin (2014) with no less than 12 pairs in 2011, in recent years the population there was estimated at 20-30 pairs (ACO & Pietro Ferrandes, pers. obs.). Not reported as eeding in the Egadi Islands by Corso (2005) and Massa *et al*. (2015), 1 confirmed breeding pair (with additional 2 probable ones) was found in Spring 2015 at Favignana, then reconfirmed in 2017-2019 (ACO, SS & Verena Penna, pers. obs.). Finally, Rubolini (2022) also reported Favignana as a nesting site. During our study, the species was confirmed breeding in 17 new squares, with scattered nests: 1-2 active nests per square, with the exception of Bosco di Magaggiaro and Molino Ferriato, between Trapani and Agrigento province (UTM UB 17) where up to 5 active nests were found in pine and oaks tree during spring 2023 (ACO, AS, MV, pers. obs.).

Tawny Owl *Strix aluco* (Fig. 12)

A strictly sedentary species with movements rarely exceeding 50 km from the breeding site. More frequent in northern and central Italy, it is local in the south and even more so in Sicily (Montemaggiori, 2022), where until about fifteen years ago it was considered common and widespread in all habitats (AA.VV., 2008). The apparent increase of the species in our study area is most likely linked to better ornithological coverage, in particular thanks to focused nocturnal monitoring.

Honey Buzzard *Pernis apivorus* (Fig. 13)

In 2022, a pair nested in the Sughereta di Angimbè (Calatafimi Segesta), on a hillside mainly covered by Downy Oak *Quercus pubescens*. On 26 June 2022, 3 individuals were observed in flight: a pair and a recently fledged juvenile. Due to a fire that burned the entire nesting area, no pairs were observed in the following years. The species, formerly not known to breed in Sicily (Corso, 2005, AA.VV., 2008), has become a regular breeder on the Peloritani and Nebrodi Mountains, albeit with just a few, scattered pairs (ACO, AS, Anna Giordano, Alessandro Micalizzi, pers. obs.). Within our study area, it is also a possible irregular breeder on the island of Pantelleria (Corso, 2025).

Eurasian Sparrowhawk *Accipiter nisus* (Fig. 14)

Not reported as breeding in the Province of Trapani in the previous Atlas (AA.VV., 2008), it was subsequently reported in the quadrant UC00 near Bosco di Scorace by Surdo (2019) and Guenzani (2022). Our study found it in seven new quadrants. This is an elusive species, especially at low densities, but its range expansion in Sicily has been facilitated by the increase in forest plantation, as is the case for other woodland species (e.g., Firecrest and Short-toed Treecreper) which were previously rarer and more localized (Corso, 2005; Surdo, 2019).

European Roller *Coracias garrulus* (Fig. 15)

Breeding confirmed in 19 quadrants according to Lo Valvo *et al.* (1993) (total for Sicily n.°47). In recent years, some new sites were discovered in the central and eastern area of the region (provinces of Caltanissetta and Catania) (AA.VV., 2008). Our study shows that at least 24 pairs nest in the western part of the island, probably reflecting better and more extensive monitoring efforts.

Great Spotted Woodpecker *Dendrocopos major* (Fig. 16)

A mainly sedentary species, it occurs in a variety of habitats (Baroni, 2022), including *Eucalyptus* plantations in Sicily (La Mantia *et al*., 2002). The only breeding records for our study area in the latest Sicilian Atlas, come from Monte Erice (Trapani) (AA.VV., 2008). In spite of an extensive search effort, we have never observed the Great Spotted Woodpecker there at any time of the year. Instead, it has been recorded nesting on Mount Bonifato (UC20) for over twenty years (Giuseppe Campo, pers. comm.). It also nests in the Angimbè forest (UC10) and in the *Eucalyptus* plantations near the Trinità, Arancio, Garcia and Poma dams and in the adjacent quadrants.

Woodchat Shrike *Lanius senator* (Fig. 17)

In Italy, this species is a long-distance migrant, whose nominate subspecies nests on mainland Italy and in Sicily, including some smaller islands (Egadi, Aeolian, Pelagie) (AA.VV., 2008). The ssp. *badius* is distributed almost exclusively in Sardinia and Corsica, with occasional cases of nesting in other parts of Italy, including the Egadi Islands in 1987 (Iapichino & Massa, 1989), where the nesting has not been confirmed in 2010-16 (Chiatante, 2022) or in subsequent years (our study). The Italian population, estimated at 10,000-20,000 pairs in the 1980s, was probably less than 4.000 pairs in the first decade of the 21st century (Brichetti & Fracasso, 2011). The apparent increase recorded during our study is almost certainly due to increased ornithological coverage. In general, as reported in AA.VV (2008), it has become rare or completely absent in much of its breeding range in Sicily, and its population often consists of very few pairs.

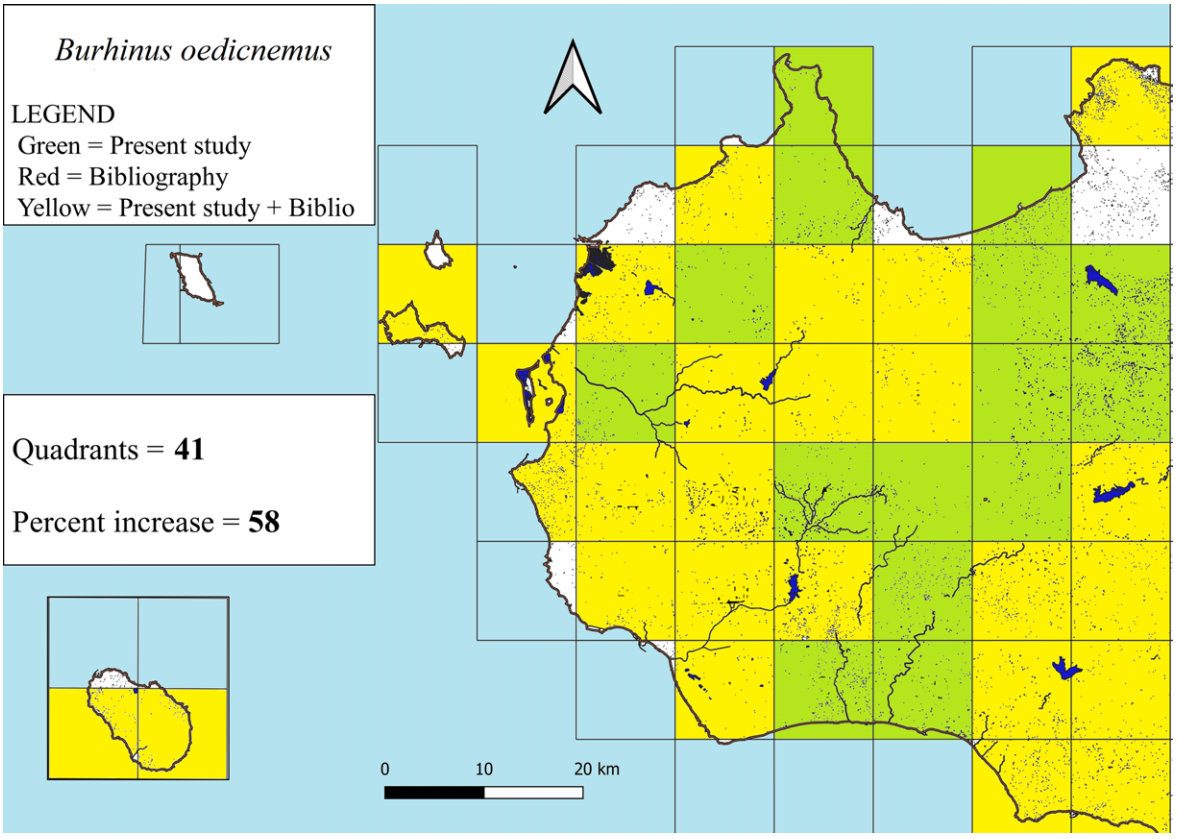

Fig. 10 – Distribution of Stone Curlew *Burhinus oedicnemus* in the study area. / Distribuzione dell'Occhione *Burhinus oedicnemus* nell'area di studio.

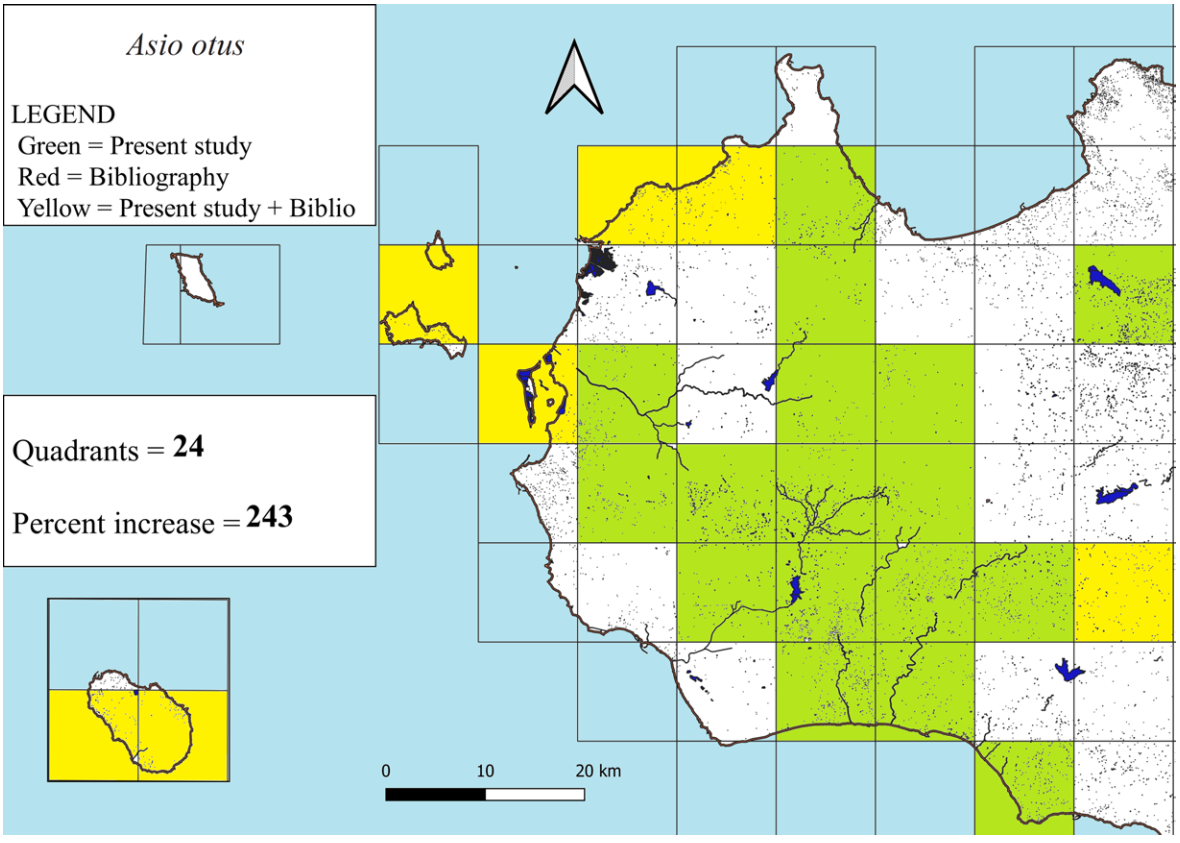

Fig. 11 – Distribution of Northern Long-eared Owl *Asio otus* in the study area. / Distribuzione del Gufo comune *Asio otus* nell'area di studio.

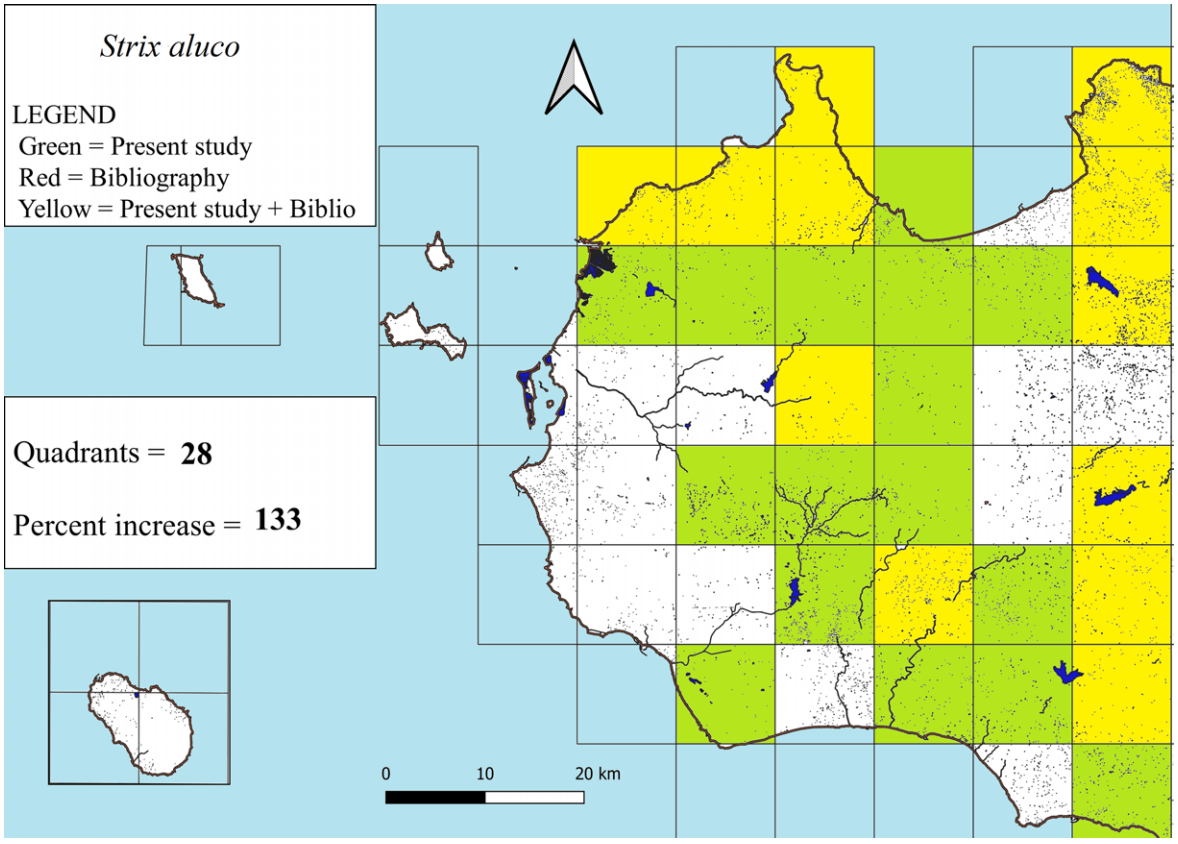

Fig. 12 – Distribution of Tawny Owl *Strix aluco* in the study area. / Distribuzione dell'Allocco *Strix aluco* nell'area di studio.

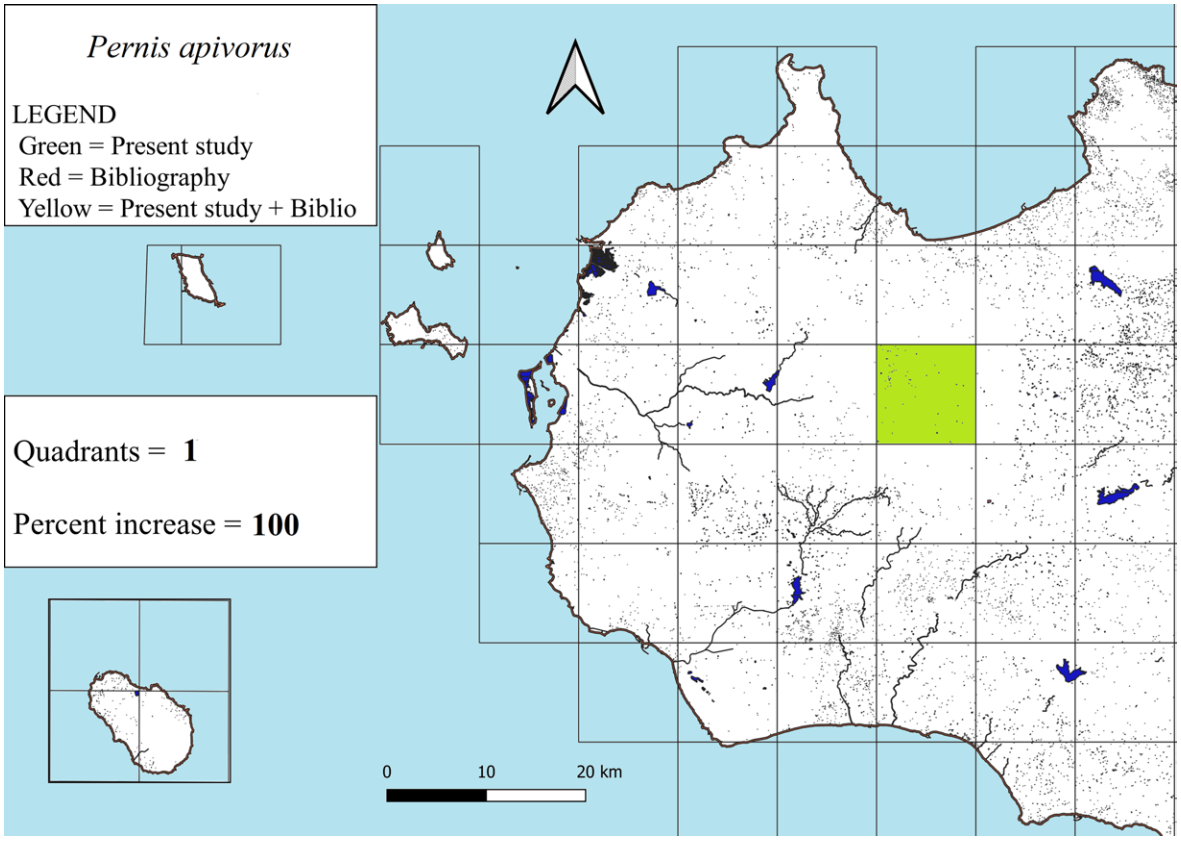

Fig. 13 – Distribution of Honey Buzzard *Pernis apivorus* in the study area. / Distribuzione del Falco pecchiolo *Pernis apivorus* nell'area di studio.

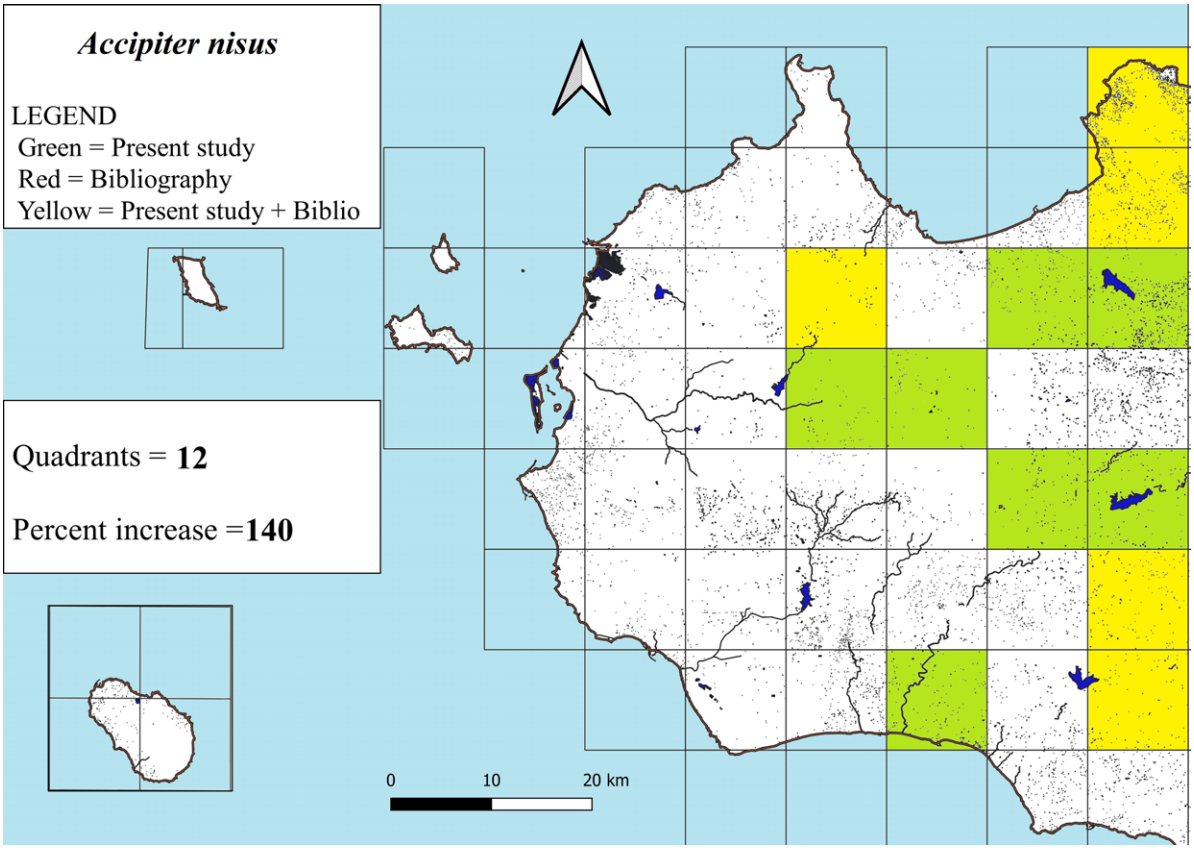

Fig. 14 – Distribution of Eurasian Sparrowhawk *Accipiter nisus* in the study area. / Distribuzione dello Sparviere *Accipiter nisus* nell'area di studio.

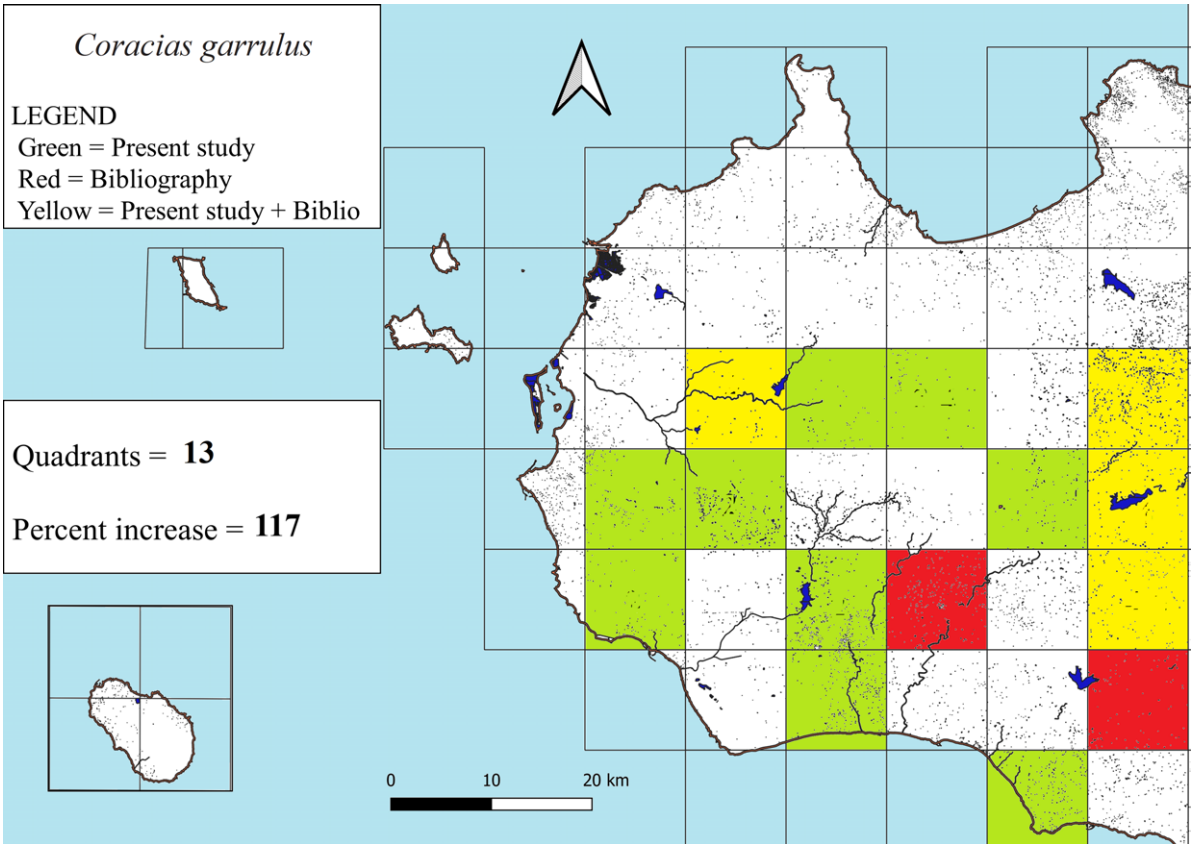

Fig. 15 – Distribution of European Roller *Coracias garrulus* in the study area. / Distribuzione della Ghiandaia marina *Coracias garrulus* nell'area di studio.

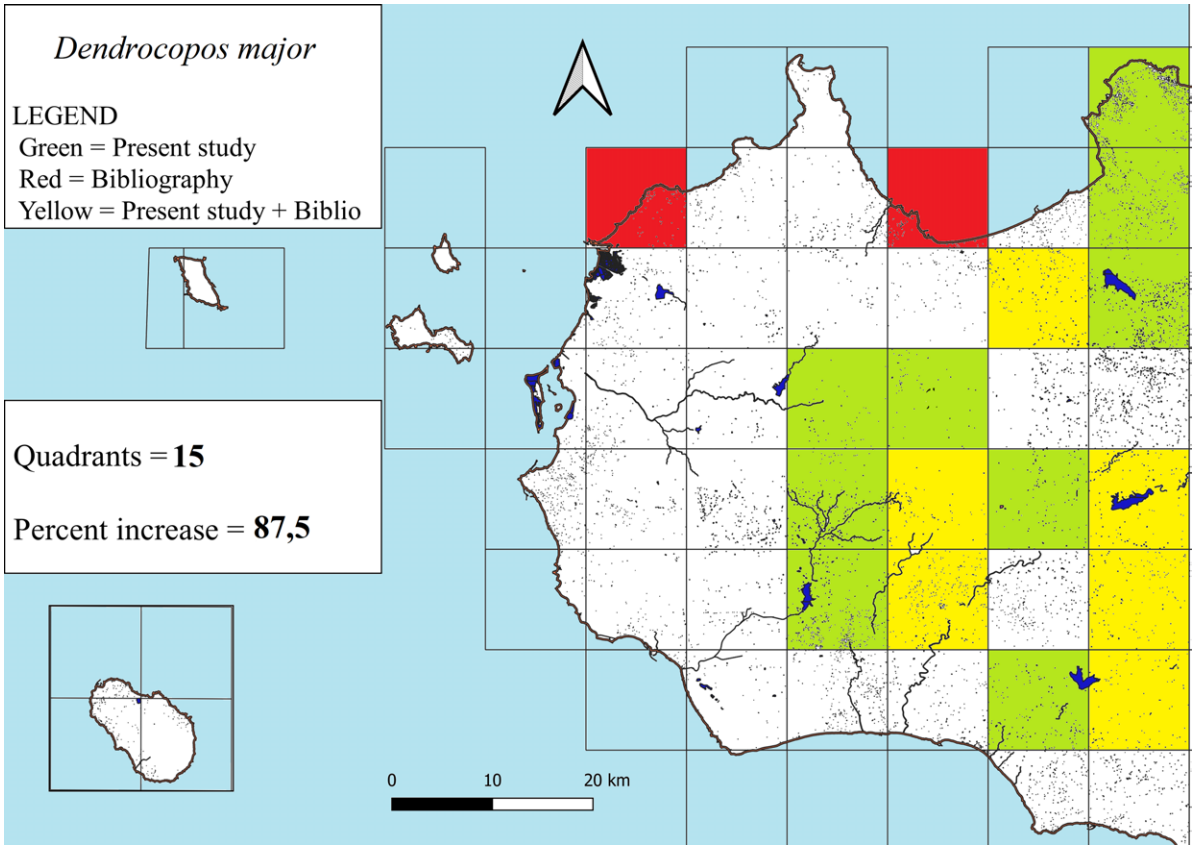

Fig. 16 – Distribution of Great Spotted Woodpecker *Dendrocopos major* in the study area. / Distribuzione del Picchio rosso maggiore *Dendrocopos major* nell'area di studio.

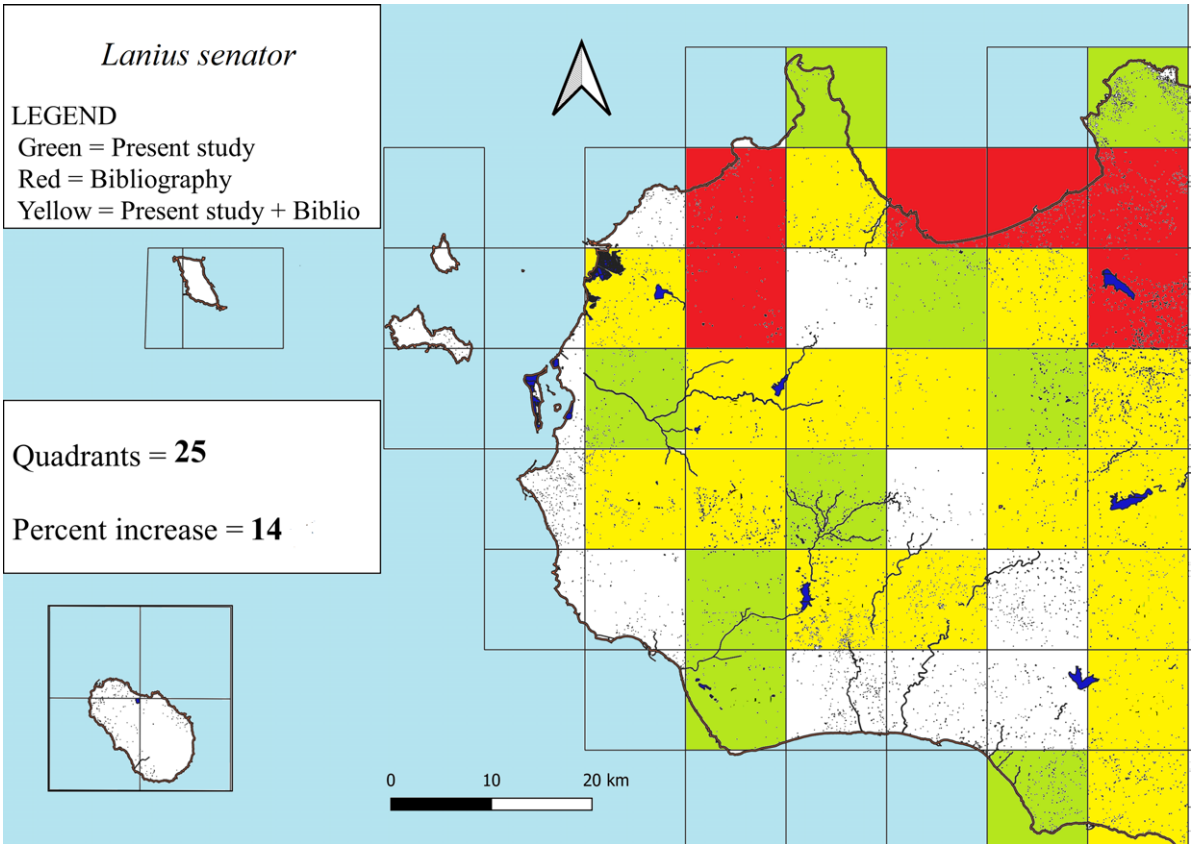

Fig. 17 – Distribution of Woodchat Shrike *Lanius senator* in the study area. / Distribuzione dell'Averla capirossa *Lanius senator* nell'area di studio.

Red-billed Chough *Pyrrhocorax pyrrhocorax* (Fig. 18)

In Italy, this sedentary species nests mainly between 1000 and 2500m a.s.l. In Sicily, nesting can occur at lower altitudes, including sea cliffs (De Sanctis, 2022). During our observations, reproduction was confirmed in three quadrants (1 new), with up to 8 individuals counted together in the period 2017-2024 in the Zingaro Nature Reserve, where there are no previous records (Corso, 2005; AA.VV., 2008). Reforestation may have caused a decline in this species in some Sicilian areas.

Calandra Lark *Melanocorypha calandra* (Figs. 19 and 20)

This species is patchily distributed in Italy, with a shrinking range, and is virtually extinct in Marche, Umbria, Abruzzo, and Calabria (Fulco, 2022). Already considered to be in drastic decline in Sicily (Massa & Siracusa, 2009; Massa & La Mantia, 2010), but with modest presences in halophilous meadows of the Saline di Trapani (AA.VV., 2008), subsequent searches have failed to find it as a breeder here. In the area of Mazara del Vallo, 3-4 singing pairs were found (TB97) in April-May 2018 and 2019 (Antonino Barbera, pers. comm.) and near Fulgatore (TC90) 4 ind. were observed singing on 08/VI/2016 (Giovanni Cumbo, pers. comm.), with 2 ind. singing on 12.VI.2018, and 1 ind. singing on 20 May 2019 (SS). More extensive and organized surveys at the "Sciare del Mazarese", conducted in August-September 2022 and April-June 2023, resulted in a maximum count of 35 singing males (20-30 breeding pairs estimated) (ACO, AS & MV, pers. obs.). Furthermore, breeding pairs were found in several other sites (see map). Surely, the apparent positive trend in our study area is only due to better and more extensive ornithological coverage rather than a real increase in the breeding population.

Greater Short-toed Lark *Calandrella brachydactyla* (Figs. 20 and 21)

This species, linked to agricultural and semi-steppic environments, is also in sharp decline (Massa & La Mantia, 2010; Knaus *et al.*, 2018; Gil-Mendoza *et al.*, 2024). It has disappeared as a breeding bird from the salt pans of Trapani and has not been found at Stagnone since 2016. Some singing individuals were still detected, not every year, in very few quadrants (TC90, TC80, UB19, TB97, and TB87) and on Favignana island (ACO, SS, pers. obs.). Regular nesting at Pantelleria island, although with a small number of pairs (Pietro Ferrandes, pers. comm.). Contrary to Surdo (2019), extensive monitoring during September 2022- October 2024 in the area west of Cave di Cusa (between this site and Stazione di Santa Nicola di Mazara), lead to the discovery of a large breeding population with a maximum >50 singing males (a minimum of 25-30 breeding pairs estimated) and post-breeding flocks of up to 200 individuals in June and 250 in July 2023, with a record number of up to 400 in September 2022 (ACO, AS, MV, pers. obs.). For Pantelleria Island, breeding was proven with several pairs within the perimeter of the airport, along the coastal areas of Arenella, Bue Marino, and Punta Fram, but always in very small numbers and with a noticeable decline both in terms of breeding population and migrants observed (Corso, 2025). As for the Calandra lark, the apparent positive trend in our study area is probably due to better ornithological coverage and not to a real increase in the breeding population.

Spectacled Warbler *Sylvia conspicillata* (Fig. 22)

In Italy, the Spectacled Warbler occurs mostly in the south, especially in Sardinia and Sicily. The environmental suitability model presented in Liuzzi (2022) shows that its potential distribution in Sicily is much wider to what found in all previous regional atlases and publications, suggesting a lack of investigation in this region. Among all the *Sylvidae*, it is the species with the least need for vegetation cover, being easily found in steppe meadows with Aneto *Anethum* sp. and Visnaga *Ammi* sp.; as highlighted by Massa (1981), in fact, Calandra and Greater Short-toed Larks frequently share the same type of habitats with Spectacled Warbler, as confirmed during monitoring undertaken during our study. The apparent positive population trend and breeding range extension probably reflects better ornithological coverage in the last ten years.

Spotted Flycatcher/Mediterranean Flycatcher *Muscicapa striata*/*Muscicapa* (*striata*) *tyrrhenica* (Fig. 23)

The first breeding records of Mediterranean Flycatcher for Sicily, in the provinces of Trapani and Palermo, were reported by Corso *et al.* (2020). Since then, nesting has been confirmed again at Erice, with 2-3 pairs always in the same site (along the old wall of the north-west part of the town, and on the wall of Chiesa di San Giovanni Battista and Torretta Pepoli), with 1-2 new breeding pairs in 2023 and 2024 at Custonaci, Scopello, Castelluzzo, and along the old walls of Marsala. A complete review of its distribution should be the object of targeted research to define distributional limits between the Mediterranean and Spotted Flycatcher and areas where these two *taxa* breed sympatrically or syntopically.

Rock Sparrow *Petronia petronia* (Fig. 24)

In Italy, the Rock Sparrow nests mostly along the Apennines north to Umbria; it is a widespread albeit scarce breeder in Sicily and Sardinia. The current distribution matches the environmental suitability model for Italy except for Sicily (Pellegrini, 2022). An elusive species, it easily goes unnoticed during field studies. It was recorded in 16 distribution squares; however, the suitable habitat and the potential breeding areas in the study area are much wider. More in-depth research is needed to confirm nesting in the Marsale and Mazare quarry areas. A similar situation of under-recording compared to the potential habitat was already noticed by Corso (2005) and in AA.VV. (2008).

Tawny Pipit *Anthus campestris* (Fig. 25)

A long-distance migratory species, its marked rarefaction in Sicily is probably due to a combination of a real decrease and a lack of investigation (Ilahiane, 2022). During our study, the species was detected in three new quadrants on the mainland. For Pantelleria island, in recent years, it has been a regular migrant with increasingly smaller numbers (as in Sicily), and nesting regularly with 1-10 pairs mainly within the airport, in addition to a few pairs along the coast at Arenella, Bue Marino, Punta Fram, San Vito, and occasionally also on some other sites (Corso, 2025). As for other species (chiefly those of semi-steppic habitat), their apparent positive trend and wider breeding range extension are most likely due to the better ornithological coverage of the area in the last decade.

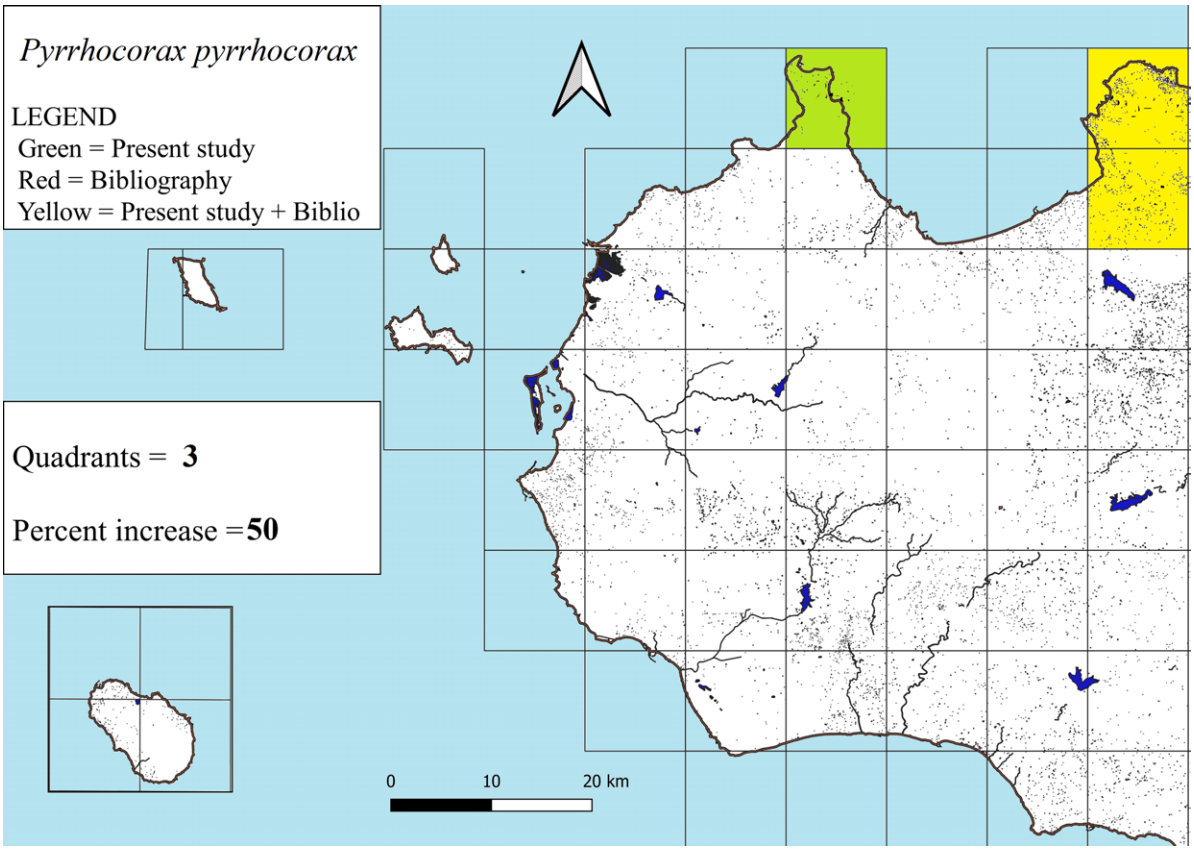

Fig. 18 – Distribution of Red-billed Chough *Pyrrhocorax pyrrhocorax* in the study area. / Distribuzione del Gracchio corallino *Pyrrhocorax pyrrhocorax* nell'area di studio.

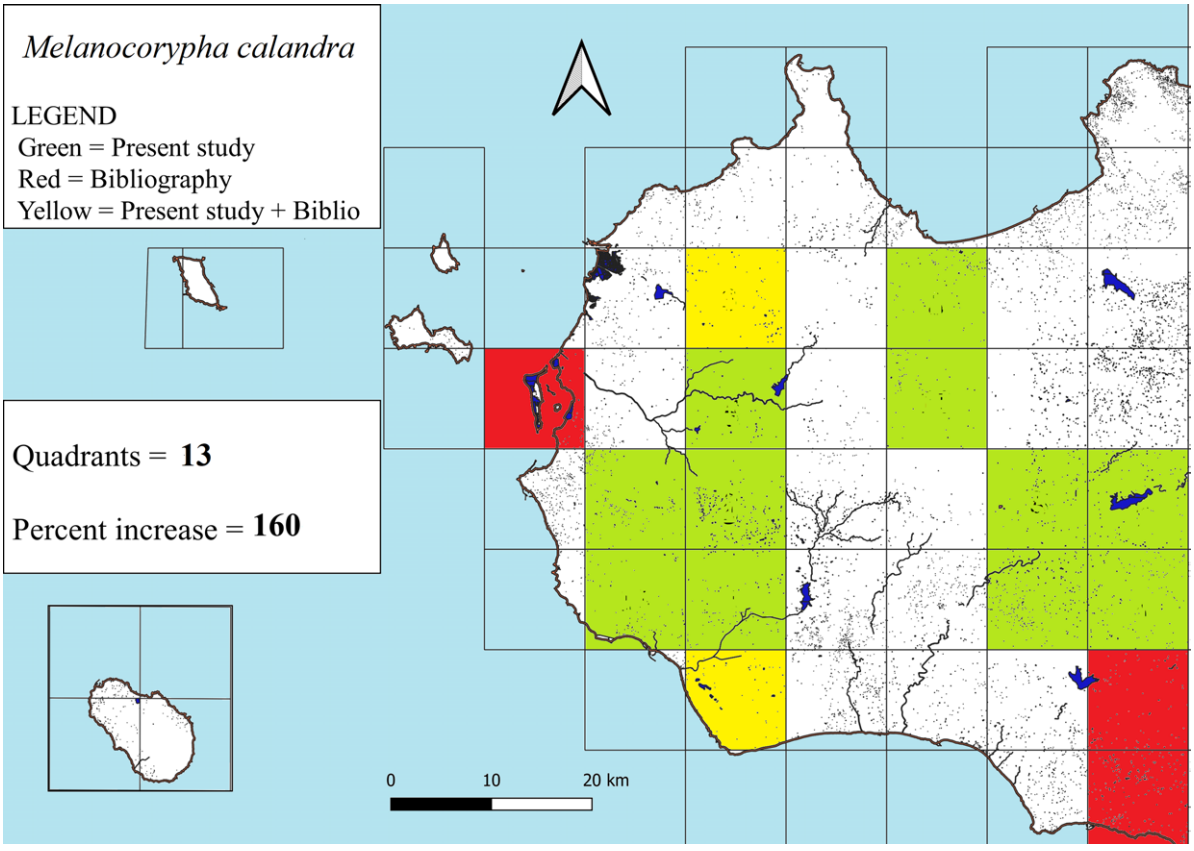

Fig. 19 – Distribution of Calandra Lark *Melanocorypha calandra* in the study area. / Distribuzione della Calandra *Melanocorypha calandra* nell'area di studio.

Fig. 20 – "*Sciare del Mazarese*", showing the typical habitat of this area used by Calandra and Greater Short-toed larks. (Photo by Antonino Barbera) / Sciare del Mazarese, un ambiente unico e minacciato dall'attività antropica, habitat prediletto da Calandra e Calandrella (Foto di Antonino Barbera).

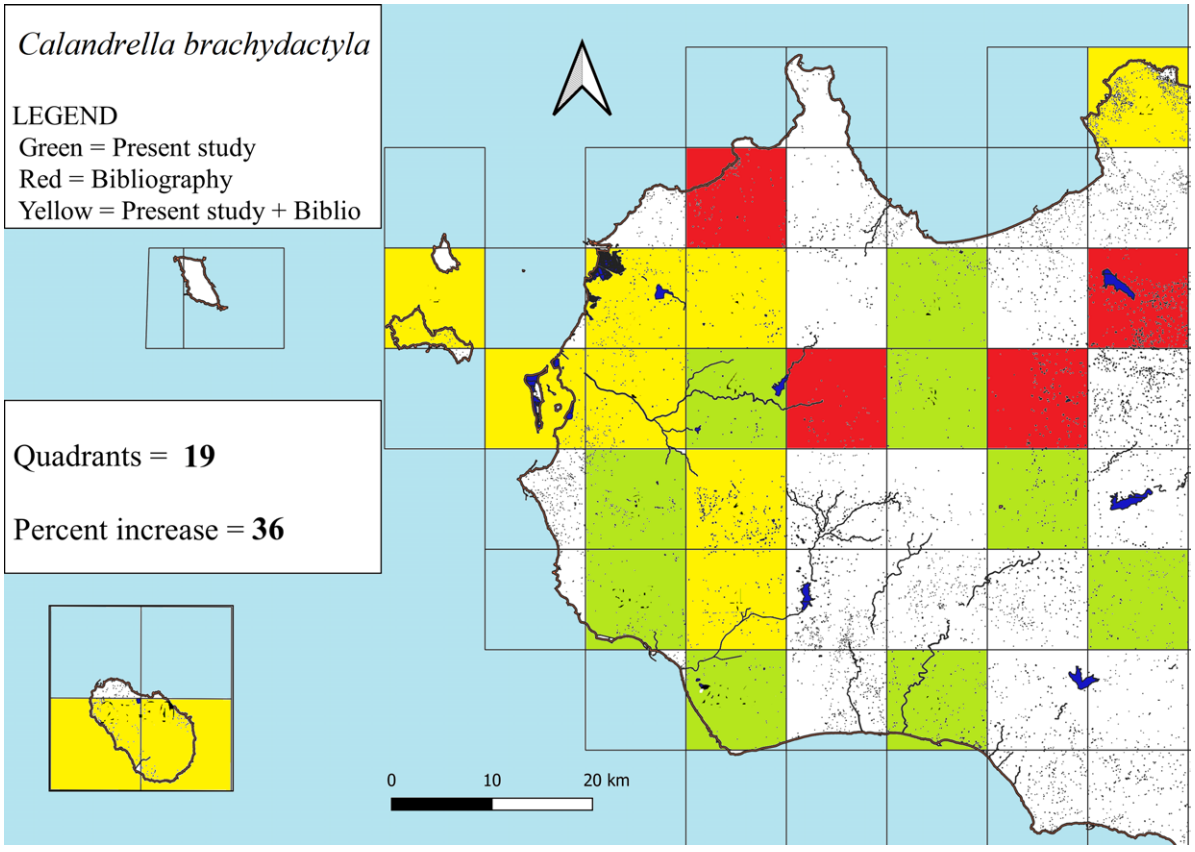

Fig. 21 – Distribution of Greater Short-toed Lark *Calandrella brachydactyla* in the study area. / Distribuzione della Calandrella *Calandrella brachydactyla* nell'area di studio.

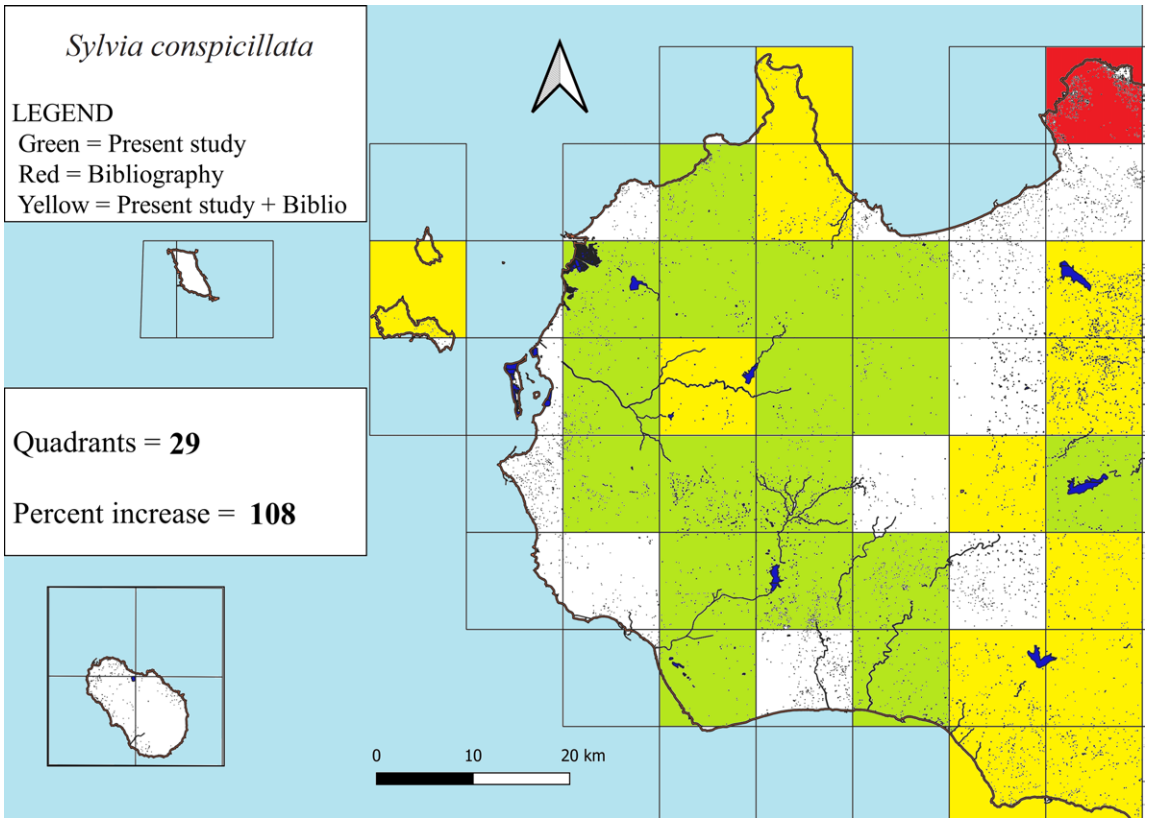

Fig. 22 – Distribution of Spectacled Warbler *Sylvia conspicillata* in the study area. / Distribuzione della Sterpazzola di Sardegna *Sylvia conspicillata* nell'area di studio.

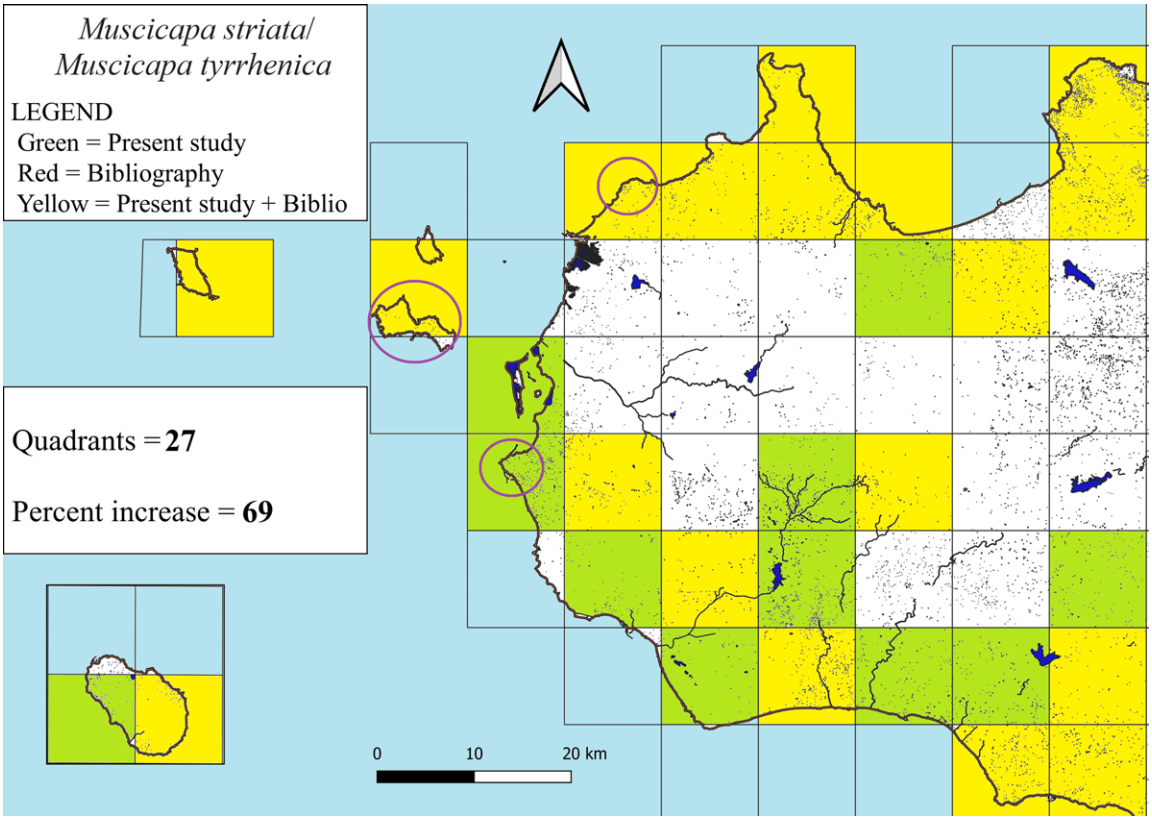

Fig. 23 – Distribution of Spotted/Mediterranean Flycatcher *(M. striata/M.(s.) tyrrhenica)* in the study area. The round black circles highlight the area where Mediterranean Flycatcher was found breeding during this study. / Distribuzione del Pigliamosche/ Pigliamosche tirrenico *(M. striata/M.(s.) tyrrhenica)* nell'area di studio. I quadranti cerchiati indicano le coppie nidificanti di *M. (s.)tyrrhenica* riscontrate nell'area di studio.

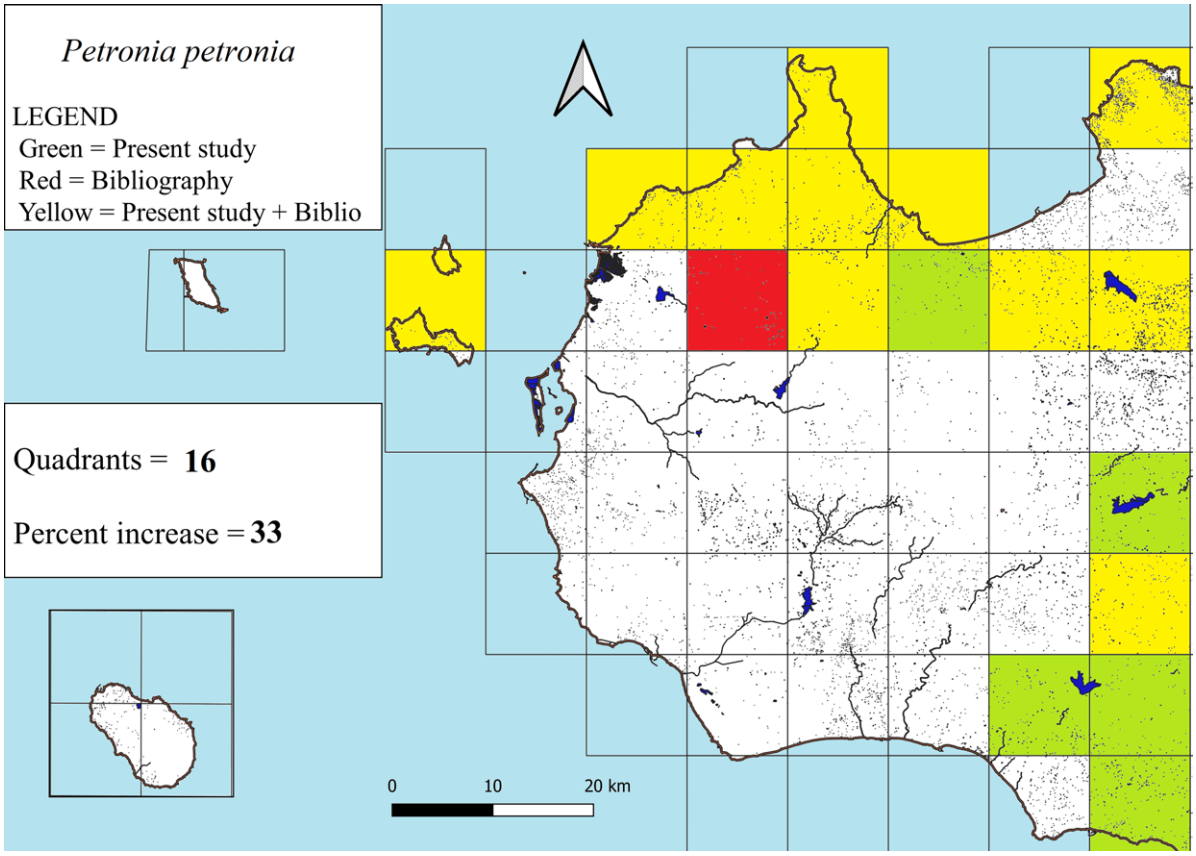

Fig. 24 – Distribution of Rock Sparrow *Petronia petronia* in the study area. / Distribuzione della Passera lagia *Petronia petronia* nell'area di studio.

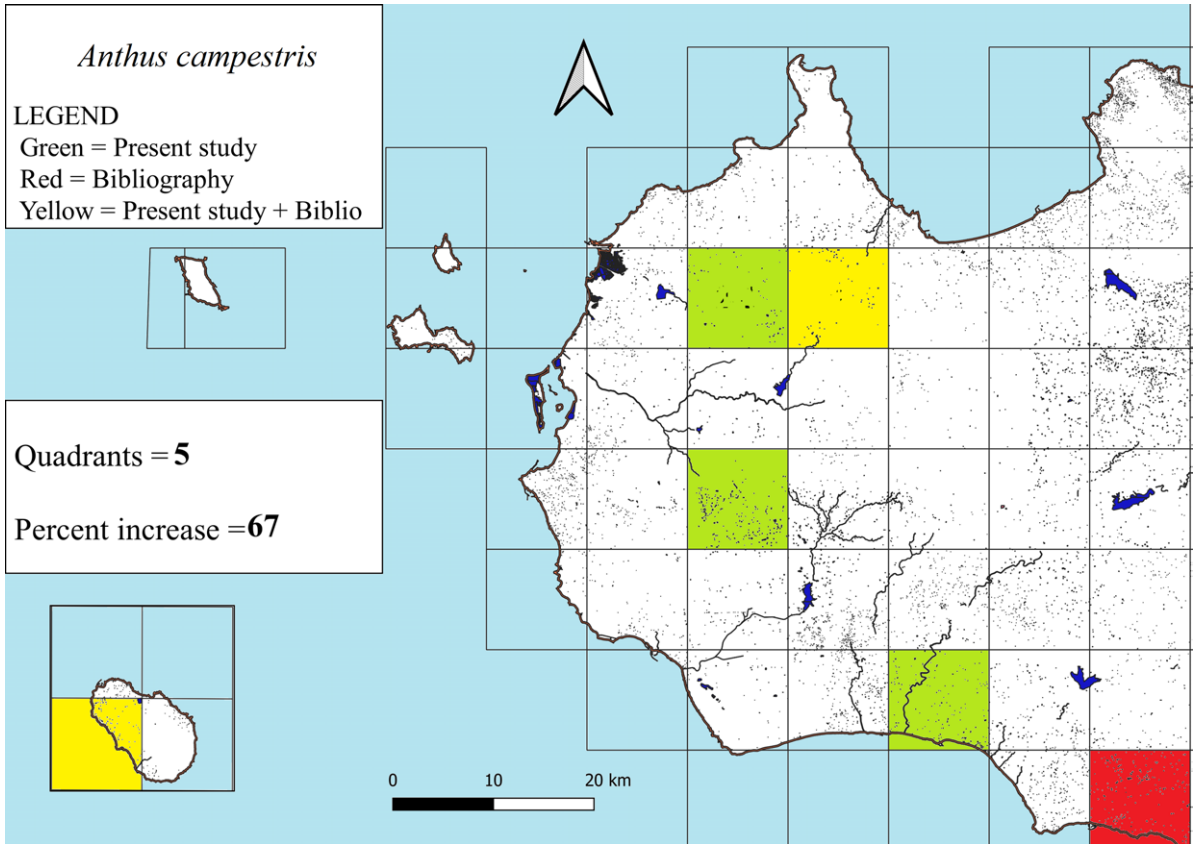

Fig. 25 – Distribution of Tawny Pipit *Anthus campestris* in the study area. / Distribuzione del Calandro *Anthus campestris* nell'area di studio.

DISCUSSION AND CONCLUSIONS

Bird atlases stand out as invaluable resources for monitoring avian populations, offering unparalleled insights into long-term, large-scale trends across a wide range of species (Donald & Fuller, 1998). In the context of accelerating biodiversity loss, these datasets can provide critical insights into the state of bird distributions across broad spatiotemporal scales and provide much-needed information for impactful conservation. In Sicily, the potential of atlas data to understand changes in avian populations remains largely untapped. Our results use presence-only data, and as such cannot be used to directly quantify population trends. However, an increase/decrease in population is generally associated with a similar trend in distribution range (Borregaard & Rahbek 2012; Donald & Fuller 1998), suggesting that distribution change can be used as a proxy for population trends. It is true that the frequency is correlated to abundance; some species may maintain the same extent of distribution while showing population declines; for others, apparent range extensions may simply reflect better coverage. Only by making numerical estimates can we truly understand the trend of a species. This criterion is one of three used by International Union for the Conservation of Nature to assess the status of a species, the other two being range size and population estimate. Here, too, two out of three criteria require quantitative data, and research efforts must be concentrated in this direction. Otherwise, we risk the paradox of apparently increasing species (see Calandra lark as an example for this work) without it being really the case. This work publishes a relevant amount of useful data in order to develop maps that better respond to the real distribution of certain species.

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