The territorial expansion of the Wood Pigeon (*Columba palumbus*) within urban centres and comparison with the Eurasian Collared Dove (*Streptopelia decaocto*)

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Abstract - Starting in the 19th century, the Wood Pigeon (*Columba palumbus*) began colonizing European urban centers, a process that continued throughout the 20th century. A similar pattern was also observed in the Eurasian Collared Dove (*Streptopelia decaocto*). Using data from repeated urban ornithological atlases from fifteen European cities, it was possible to study the rate of expansion of the Wood Pigeon's breeding range in urban centers and compare it with that of the Eurasian Collared Dove. While the former shows an ongoing expansion, with different territorial expansion depending on the size of the city and the period when colonization began, the latter is in decline in cities where it had reached saturation of its breeding range and shows a lower rate of expansion. Possible competition between the two species in urban areas is also analyzed.

Keywords: Wood pigeon, breeding range expansion, Urban ornithological atlases, Eurasian Collared dove.

Riassunto - L'espansione territoriale del colombaccio (*Columba palumbus*) nei centri urbani e il confronto con la tortora dal collare (*Streptopelia decaocto*). A partire dal XIX secolo il colombaccio (*Columba palumbus*) ha avviato un processo di colonizzazione dei centri urbani europei che è continuato fino a tutto il XX secolo. Un processo analogo lo ha condotto anche la tortora dal collare (*Streptopelia decaocto*). Utilizzando i dati ricavabili dagli atlanti ornitologici urbani di 15 città europee ripetuti nel tempo è stato possibile studiare l'ampiezza della espansione dell'areale riproduttivo del colombaccio nei centri urbani e confrontarla con quella della tortora dal collare. Mentre il primo mostra una espansione ancora in atto, con misure diverse in funzione della dimensione della città e del periodo di inizio del processo di colonizzazione, la seconda invece è in regressione nelle città in cui aveva raggiunto la saturazione dell'areale riproduttivo e mostra una crescita inferiore, là dove è in atto un processo di espansione. Viene analizzata anche un'eventuale competizione tra le due specie in ambito urbano.

Parole chiave: colombaccio, velocità di espansione areale riproduttivo, atlanti ornitologici urbani, tortora dal collare.

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INTRODUCTION

In 1976, Tomialojc published an extensive article on the urban populations of Wood Pigeons (*Columba palumbus*) in Europe, the origin of the colonization process, its increase over time, and its distribution on a continental scale (Tomiałojć, 1976). The author traces the origin of the phenomenon back to the decade 1830-1840 and identifies Paris as the first city to be colonized around 1831. From that moment on, and throughout the 19th century, the species colonized several cities in central and northern Europe, from London to Krakow, with isolated colonization in Milan and other urban centers in the Po Valley. During the 20th century, the process continued, and this species expanded in the rest of Europe, reaching Warsaw in 1960, Malmö, Sweden, in 1930, and many Central European cities such as Prague in 1940, Bern in 1920, and Frankfurt in 1930 (Tomiałojć, 1976; Dejonghe, 1983).

Tomiałojć reports that the colonization of various European cities is associated with their location in fertile agricultural areas, and that the urban colonization of the Wood Pigeon begins when overpopulation occurs in agricultural areas or in forests adjacent to the city. Colonization would start in the suburbs and, as mistrust of humans decreases, Wood Pigeons progressively move toward the city center, eventually occupying urban parks. He identifies a five-stage process of urban center colonization and also estimates the speed of expansion of the species in the first 80 years and the following 70 years. This is not an easy calculation and is very approximate, considering that the expansion took place in several directions. He also reports that the annual rate of expansion is 12 times lower than that of the Collared Dove (Tomiałojć, 1976). However, the hypothesis that the urban colonization of the Wood Pigeon depends on the overpopulation of agricultural areas and adjacent forests cannot be extended to the entire European continent. In Turin (north-western Italy), for example, the first pairs were more frequent in the city center urban parks and less in the suburbs (Boano, pers.comm.); In Naples, colonization began with wintering in a large city park. (Fraissinet & Capasso, 2020).

The colonization of European urban centers continued even after the 1970s, spreading in all directions. Towards Eastern Europe, in Belgorod, Russia, for example, it began nesting in cities in the 1990s (Lykov, 2025). Towards the south, reaching Mediterranean cities: in Venice, it began

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nesting in the 1990s (Bon & Stival, 2025), in Marseille, it began nesting in 2006 (Barthélémy, 2015), and in Naples in the five-year period 2001-2005 (Fraissinet & Capasso, 2020). Towards the west, the author saw it nesting in 2014 in both Brest and Rennes, in Brittany (France), and it has been reported in several cities on the Iberian Peninsula (Keller *et al*., 2020). Northwards: it began nesting in Helsinki and Turku, Finland, in the 1990s, and then reached Rovaniemi in Lapland (Jokimäki & Jokimäki, 2012). South-eastwards: it began nesting in Cluj, Romania, in 2016 (Ferenc *et al.*, 2021).

The Wood Pigeon now has a distribution that covers almost the entire European continent, and within this extensive range, it is a common species in many urban areas (Keller *et al.*, 2020).

At the same time, urban ornithological atlases have become much more common in Europe over the last few decades (Luniak, 2017; Dinetti, 2019; Fraissinet, 2023; Fraissinet *et al*., 2024a), and more recently, a first group of urban ornithological atlases repeated over time has been formed, a research technique that can provide a considerable amount of data for ornithological research (Fraissinet *et al.*, 2024b).

Using data from repeated urban ornithological atlases over time, we investigated the rate of expansion of the breeding range within cities once colonization had begun.

We also extended the analysis of the phenomenon to the Eurasian Collared Dove (*Streptopelia decaocto*) to compare it with another *Columbidae* species that has shown a strong range expansion in Europe over the last few centuries. Native to South Asia, the Collared Dove began colonizing Europe in the 1930s, occupying the entire southeastern part of Europe by the 1940s. Subsequently, in the 1950s, it colonized the central part of the continent, then proceeded eastwards in the 1970s, occupying most of European Russia and the Baltic regions, westwards, occupying France and the British Isles, and northwards, reaching the southern part of Scandinavia. Further expansion took place in the 1990s with the colonization of the Alps, most of the Italian peninsula and the north of the Iberian peninsula (Dejonghe, 1983; Brichetti & Gariboldi, 1997; Brichetti & Fracasso, 2006). With the publication of the second atlas of breeding birds in Europe, further expansion was recorded towards the south, colonizing the entire Iberian Peninsula and the southern part of the Balkan Peninsula, and towards the north, with the colonization of the Norwegian coast and part of central Finland. Between 2000 and 2016, the nesting population in Europe increased by approximately 80%, with a particular preference for urban centers (Keller *et al.*, 2020).

METHODS

Data from urban ornithological atlases repeated over time in 15 European cities were used. The northernmost city is London (51°30′26″N 0°07′39″W), and the southernmost is Caltanissetta (37°29′29.3″N 14°03′44.8″E) (Fig. 1). These cities were chosen because the ornithological atlas method consists, for all of them, in the use of regular survey units, formed by quadrants. Depending on the city, the side

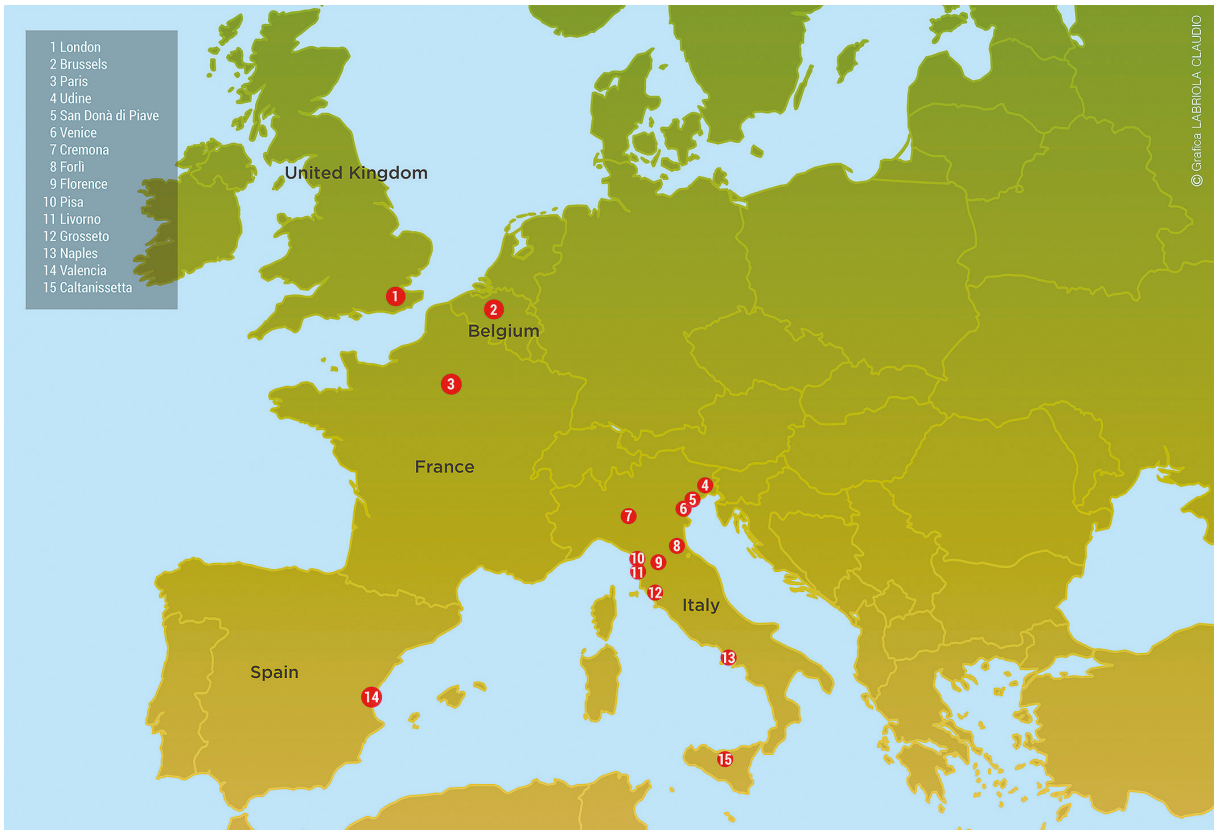

Fig.1 - Location of the cities studied. / Localizzazione delle città studiate.

length is 0.5-1 km. This allows the size of the breeding area in the city to be calculated, taking into account the size of the individual quadrants. In addition, and equally important, the repeated atlases used the same survey methods and grid dimensions for the quadrants over time. There are two atlas repetitions in most cities, while in Florence, Naples, Livorno, Grosseto (Italy), and Brussels (Belgium) there are three; in Cremona (Italy), there are even four.

By comparing the repeated atlases of individual cities, it is possible to measure the expansion or contraction of the breeding range of the Wood Pigeon and Collared Dove over time. This can be measured in terms of the difference in area occupied in km², the difference in quadrants occupied between one atlas and the next, the increase or decrease in area and number of quadrants occupied, and an estimate of the average annual rate of expansion can also be made using the formula:

$$(At2 - At1) / (t2-t1)$$

where:

At2 = Area in km² of the subsequent atlas,

At1 = Area in km² of the previous atlas,

(t2-t1) = Number of years between one atlas and the next, referring to the actual end date of the census and not to the publication of the work.

The use of ornithological atlases for this study necessarily involves limitations, deriving from the fact that each atlas is compiled independently of the others in terms of the duration of field surveys and the time between one atlas and the next. Another limitation is the impossibility of working on a value for a single year or an annual average among those monitored, because the fieldwork for an atlas progressively covers the entire territory to be surveyed year after year. Obviously, the rate of expansion may not have been constant over the years; it may have accelerated and slowed, and the average value, therefore, cannot account for this.

This, in fact, makes it impossible to perform statistical analyses to compare the data. Despite this, the use of ornithological atlases repeated over time represents the best, and probably the only, method for verifying the expansion or regression of the two species in the studied cities, and making estimates that can provide an idea of the scale of the phenomenon and its evolution over time in each city. Fig. 2 shows an example of breeding-range expansion in the cities of Naples and Cremona, as reported in several published urban ornithological atlases.

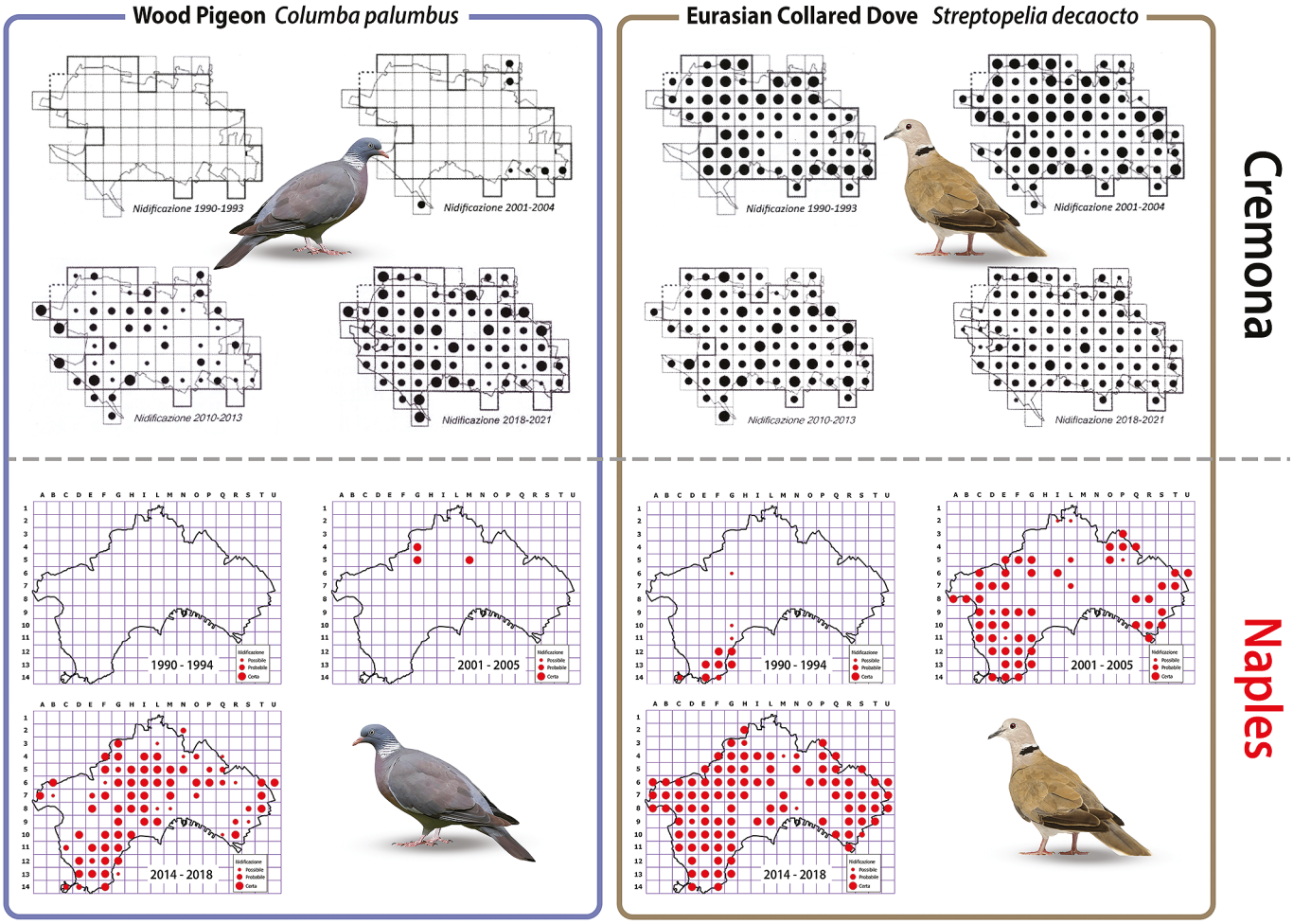

Fig. 2 - Maps showing the distribution during the breeding season of the Wood Pigeon (*Columba palumbus*) and the Eurasian Collared Dove (*Streptopelia decaocto*) for various editions of the ornithological atlases of Cremona and Naples. / Mappe che riportano la distribuzione in periodo riproduttivo di Colombaccio (*Columba palumbus*) e Tortora dal collare (*Streptopelia decaocto*) per diverse edizioni degli atlanti ornitologici di Cremona e Napoli.

RESULTS

Table 1 shows, for each city surveyed :1) the completion dates related to the field monitorings for of the atlas, 2) the area in km² occupied by the Wood Pigeon in each city, 3) the percentage of occupied quadrants, 4) the percentage increase or decrease of the occupied area expressed in square kilometers and occupied quadrants, and 5) the rate of expansion calculated in km²/year between one atlas and the next.

The cities in the Table 1 are listed by the latitudinal gradient. Following this gradient, it can be seen that, in all cities except Paris, where a decrease was recorded, the growth of the breeding area in km² and the number of occupied quadrants increases towards the south, i.e. where urban colonization began more recently, including some cities that were not reported as nesting sites in the first atlas. Expansion rates varied widely among cities,

Tab.1 - Rate of expansion of the Wood Pigeon (*Columba palumbus*) between one atlas and the next calculated in percentage increasing or decreasing and in km2/year. / Tasso di espansione del colombaccio (*Columba palumbus*) da un atlante all'altro, calcolato in percentuale di aumento o diminuzione e in km²/anno.

European city (State) latitude	1° Atlas	2° Atlas	*inc.or dec. %*	Km²/ year	2° Atlas	3° Atlas	*inc.or dec. %*	Km²/ year	3° atlas	4° Atlas	*inc.or dec. %*	Km²/ year	References
London (GB) 51°30'N	1972	1994											
occupied surface area in Km2	367	404,5	*10,00*	**1,7**									Montier, 1977;
% of 2 km squares occupied	85,7	96,8	*12,7*										Hewlett J. (ed.), 2002
Brussels (B) 50°50'N	1991	2004			2004	2024							
occupied surface area in Km²	190	191	*0,5*	**0,1**	191	187	*-2,0*	**-0,2**					Rabosé *et al.,* 1995;
% of 1 km squares occupied	98,9	99,4	*0,5*		99	94	*-5,0*						Weiserbs & Jacob, 2007
Paris (F) 48°51'N	2008	2018											
occupied surface area in Km²	85	83	*-2,3*	**-0,2**									Malher *et a* l., 2010;
% of 1 km squares occupied	97,7	95,4	*-2,3*										Malher et al., 2020
Udine (I) 46°04'N	2005	2021											
occupied surface area in Km²	40	81	*123,0*	**2,6**									Parodi, 2008;
% of 1 km squares occupied	53,3	100	*87,6*										Tringa F.V.G., 2022
San Donà di Piave (I) 45°37'N	1999	2016											
occupied surface area in Km²	3,75	13,25	*253,3*	**0,6**									Nardo, 2003;
% of 0,5 km squares occupied	24,5	92,5	*277,5*										Nardo *et al.* , 2019
Venezia (I) 45°26'N	2011	2022											
occupied surface area in Km²	114	167	*46,5*	**4,8**									Bon & Stival, 2013;
% of 1 km squares occupied	82	100	*21,9*										Bon & Stival, 2025
Cremona (I) 45°08'	1993	2004			2004	2013			2013	2021			
occupied surface area in Km²	0	1,75		**0,2**	1,75	11,25	*542,8*	**1,1**	11,25	17,2	*52,80*	**0,7**	Groppali, 1994; Groppali, 2004;
% of 0,5 km squares occupied	0	9			9	61	*577,7*		61	77	*26,2*		Groppali, 2015; Groppali, 2023
Forlì (I) 44°13'N	2006	2017											
occupied surface area in Km2	0	5,75		**0,5**									Ceccarelli *et al.* , 2006;
% of 0,5 km squares occupied	0	13											Ceccarelli *et al.* , 2020
Florence (I) 43°46'N	1988	1998			1998	2008							
occupied surface area in Km²	2	15	*650,0*	**1,3**	15	104	*593,3*	**8,9**					Dinetti e Ascani, 1990;
% of 1 km squares occupied	1,7	13,6	*700,0*		13,6	84	*517,6*						Dinetti e Roman, 2002; Dinetti, 2009
Pisa (I) 43°43'N	1998	2018											
occupied surface area in Km²	3,75	25,5	*580,0*	**1,1**									Dinetti, 2003; Dinetti, 2018
% of 0,5 km squares occupied	12,9	87,9	*581,3*										
Livorno (I) 43°33'N	1993	2013			2013	2025							
occupied surface area in Km²	0	0,25		**0,0**	0,3	8,5	*2733,3*	**0,7**					Dinetti, 1994; Dinetti *et al.* 2013
% of 0,5 km squares occupied	0	0,5			0,5	19,2	*3740,0*						Tiengo & Dinetti, 2015
Grosseto (I) 42°46'N	1999	2010			2010	2020							
occupied surface area in Km²	0	1,5		**0,1**	1,5	21,25	*1316,6*	**2,0**					Giovacchini, 2001; Giovacchini, 2011;
% of 0,5 km squares occupied	0	6,5			6,5	90,1	*1286,1*						Giovacchini *et al.* , 2021
Naples (I) 40°50'N	1994	2005			2005	2018							
occupied surface area in Km²	0	3		**0,3**	3	75	*2400,0*	**5,5**					Fraissinet, 1995; Fraissinet, 2006;
% of 1 km squares occupied	0	21,1			2,1	52,8	*2414,2*						Fraissinet e Capasso, 2020
Valencia (E) 39°29'N	1998	2018											
occupied surface area in Km²	2	29,75	*1387,5*	**1,4**									Murgui, com. pers,;
% of 0,5 km squares occupied	0,19	28,5	*14900,0*										Murgui, 2022
Caltanissetta (I) 37°29'N	2006	2020											
occupied surface area in Km²	3,75	13,25	*253,3*	**0,7**									Falci, com. pers.;
% of 0,5 km squares occupied	24,5	92,5	*277,5*										Nardo *et al.* , 2023

ranging from -0.20 km²/year in Paris to +8.90 km²/year in Florence, calculated between the first and second urban ornithological atlases over a 10-year interval.

It should also be noted that in cities where the species was initially absent or very localized in the first atlas, the rate of expansion is low, but then increases in cities where subsequent atlases have been published, with the city of Naples recording a rate of expansion of 5.53 km²/year between the second and third atlases, and Florence 8.9 km²/year. A lower rate is recorded in Grosseto and Cremona, which are, however, smaller cities than Naples and Florence. However, for all of them, the percentage increase in the breeding area in square kilometers and the number of occupied quadrants remains high. Cities such as Venice, San Donà di Piave and Udine, which had already shown a fairly good urban distribution of the species in the first atlas, still recorded a high rate of expansion between the first and second atlases. Respectively, 4.81 km²/year and 2.56 km²/year. The percentage increase values are also modest, but more moderate than in cities located at lower latitudes.

Low expansion rates are recorded not only in the aforementioned small cities, but also in those where the species was already widely distributed. In this case, there may even be a negative figure for Paris.

The situation of the Eurasian Collared Dove in Table 2 appears to be different. Unlike the Wood Pigeon, this species is already present in all cities in the first atlas, recording lower values for percentage increase in expansion, occupied quadrants, and expansion rate over the years. In several cities, it also shows a decrease. In cities where higher values were recorded, such as Florence and Naples, this decrease occurred in the transition from the second to the third atlas.

Furthermore, in some cities, it reached a saturation point in the territory during the period covered by the atlases, and therefore, the rate of expansion has stopped: Grosseto, Cremona, Forlì. It should be noted that the cities where regression was observed started from a situation close to saturation: Brussels, Udine, Livorno, San Donà di Piave.

DISCUSSION

The Wood Pigeon and the Eurasian Collared Dove are two species that underwent rapid and widespread expansion across the European continent during the 19th and 20th centuries (Tomiałojć, 1976; Brichetti & Gariboldi, 1997; Keller *et al*., 2020). The former expanded from northern and, to some extent, central Europe, while the latter expanded from south-eastern Europe.

This expansion process also affected cities at different times and in different ways, both between cities and between species, with the Wood Pigeon colonizing some cities first and the Eurasian Collared Dove others.

As already reported in the results, the different methodological approaches used in the atlases of the 15 cities, particularly with regard to the duration of the field survey period, make it impossible to follow the evolution of the colonization process over the years, but only once the work has been completed, thus preventing analyses based on statistical elements from being carried out.

Despite those limitation, a comparison of the two tables highlights shows interesting differences. The Wood Pigeon (Tab. 1) does not show regression values, with the sole exception of Paris. Brussels shows a slight decrease in the size of its range and rate of expansion, a trend confirmed in the third atlas. It should be noted that Paris and Brussels are two cities where colonization began a long time ago (Tomiałojć, 1976), and the Wood Pigeon has therefore been able to saturate all suitable habitats in the city, as demonstrated by the high number of quadrants and the large range in the first atlas.

The expansion rate also appears to be low in those cities where the saturation of suitable environments has not been completed, but is at an advanced stage. This is the case in London, Udine, and San Donà di Piave.

The situation is different in cities where colonization is more recent. In these cities, the rate of expansion is initially low due to the small number of initial pairs. However, it then increases significantly once colonization of the city is consolidated and the process of occupying suitable environments begins. In these cases, the rate of expansion can vary between 2.5 km²/year in Udine and 4.8 in Venice, 5.5 in Naples and up to 8.9 in Florence. The rate remains low in small cities such as Cremona and Grosseto. In all these cities, with the exception of Venice, the percentage increase in area in square kilometers and in the number of occupied quadrants is high.

Such high values are not observed in Table 2 for the Eurasian Collared Dove, where several negative values indicate a slow but ongoing rate of decline in one-third of the cities examined. Where no decline is recorded, we see static values in cities that have become saturated over time, or ongoing expansion, as in Naples and Florence, which nevertheless show lower rates than the Wood Pigeon.

The values relating to the percentage increase in area in square kilometers and the number of occupied quadrants also remain significantly lower than those for the Wood Pigeon. The exception is Naples, which has high numbers in the transition from the first to the second atlas, then decreases in the transition from the second to the third, coinciding with a higher percentage of occupied quadrants. The situation in Cremona is interesting, where, once the occupied quadrants reached saturation point, the species remained stable.

The Wood Pigeon, therefore, generally shows a higher rate of expansion than the Eurasian Collared Dove, but also a delayed colonization process in cities located at lower latitudes, while the Eurasian Collared Dove was already present in the first atlas in all the cities surveyed. In cities where the Wood Pigeon settled after the first atlas, the second atlas also recorded very high values in the various parameters investigated, which then decreased in cities where a third and fourth atlas were also published. The Eurasian Collared Dove, on the other hand, appears to have reached saturation in several cities, followed by several subsequent phenomena of regression. The latter phenomenon is also confirmed by data from the recent European atlas (Keller *et al*., 2020).

In some Hungarian cities, the decline of the Eurasian Collared Dove has coincided with an increase in the

Wood Pigeon (Csathò & Bozo, 2022). This competition does not seem to concern food resources (Murton, 1965), but more likely the choice of nesting site, as both species are mainly arboreal and subject to predation of eggs and chicks by crows (*Corvus corone* and *Corvus cornix*) (Varga & Juhasz, 2020). However, compared to the Eurasian Collared Dove, the Wood Pigeon seems to have a greater propensity to colonize even the central and densely urbanized areas of cities, where, in recent years, in cities such as Paris (Malher *et al*, 2020) and Turin (Boano, pers. comm.), it has also been recorded nesting on buildings and not only on trees. The Eurasian

Tab.2 - Rate of expansion of the Eurasian Collared Dove (*Streptopelia decaocto*) between one atlas and the next calculated in percentage increasing or decreasing and in km2/year. / Tasso di espansione della tortora dal collare (*Streptopelia decaocto*) da un atlante all'altro, calcolato in percentuale di aumento o diminuzione e in km²/anno.

European city (State) latitude	1° Atlas	2° Atlas	inc.or dec. %	Km²/ year	2° Atlas	3° Atlas	inc.or dec. %	Km²/ year	3° atlas	4° Atlas	inc.or dec. %	Km²/ year	References
London (GB) 51°30'N	1972	1994											
occupied surface area in Km²	285	309,5	*59,6*	**1,1**									Montier, 1977; Hewlett J. (ed.), 2002
% of 2 km squares occupied	33,2	72,3	*117,7*										
Brussels (B) 50°50'N	1991	2004			2004	2024							
occupied surface area in Km²	178	169	*-5*	**-0,6**	169	149	*-11,8*	**-1,0**					Rabosé *et al.*, 1995; Weiserbs & Jacob, 2007
% of 1 km squares occupied	92,7	88	*-5*		88	75	*-14,7*						
Paris (F) 48°51'N	2008	2018											
occupied surface area in Km²	14	7	*-50*	**-0,7**									Malher *et a* l., 2010; Malher et al., 2020
% of 1 km squares occupied	16	8	*-50*										
Udine (I) 46°04'N	2005	2021											
occupied surface area in Km²	70	68	*-2,8*	**-0,1**									Parodi, 2008; Tringa F.V.G., 2022
% of 1 km squares occupied	93,3	84	*-0,9*										
San Donà di Piave (I) 45°37'N	1999	2016											
occupied surface area in Km²	13	11,49	*-11,5*	**-0,1**									Nardo, 2003; Nardo *et al.*, 2019
% of 0,5 km squares occupied	94,5	83,6	*-11,5*										
Venezia (I) 45°26'N	2011	2022											
occupied surface area in Km²	106	127	*19,8*	**1,9**									Bon & Stival, 2013; Bon & Stival, 2025
% of 1 km squares occupied	76	75	*-1,3*										
Cremona (I) 45°08'	1993	2004			2004	2013			2013	2021			
occupied surface area in Km²	14,5	25	*72,4*	**1,0**	25	25	*0*	**0,0**	25	25	*0*	**0,0**	Groppali, 1994; Groppali, 2004; Groppali, 2015; Groppali, 2023
% of 0,5 km squares occupied	85	100	*17,6*		100	100	*0*		100	100	*0*		
Forlì (I) 44°13'N	2006	2017											
occupied surface area in Km2	30,25	41,25	*36,3*	**1,0**									Ceccarelli *et al.*, 2006; Ceccarelli *et al.*, 2020
% of 0,5 km squares occupied	68,36	93,22	*36,3*										
Florence (I) 43°46'N	1988	1998			1998	2008							
occupied surface area in Km²	32	75	*134,3*	**4,3**	75	97	*29,3*	**2,2**					Dinetti e Ascani, 1990; Dinetti e Roman, 2002; Dinetti, 2009
% of 1 km squares occupied	26,9	63	*134,2*		63	78,2	*24,1*						
Pisa (I) 43°43'N	1998	2018											
occupied surface area in Km²	13,5	25,25	*87*	**0,6**									Dinetti, 2003; Dinetti, 2018
% of 0,5 km squares occupied	46,6	87,1	*86,9*										
Livorno (I) 43°33'N	2005	2021											
occupied surface area in Km²	70	68	*-2,8*	**-0,1**									Dinetti, 1994; Dinetti *et al.* 2013 Tiengo & Dinetti, 2015
% of 0,5 km squares occupied	89,8	72,9	*-18,8*										
Grosseto (I) 42°46'N	1999	2010			2010	2020							
occupied surface area in Km²	59	68,5	*16,1*	**0,5**	21,25	21,25	*0*	**0,0**					Giovacchini, 2001; Giovacchini, 2011; Giovacchini *et al.*, 2021
% of 0,5 km squares occupied	56,1	65,2	*16,2*		93,4	90,1	*-3,5*						
Naples (I) 40°50'N	1994	2005			2005	2018							
occupied surface area in Km²	11	58	*427,2*	**4,3**	58	99	*75,8*	**3,2**					Fraissinet, 1995; Fraissinet, 2006; Fraissinet e Capasso, 2020
% of 1 km squares occupied	7,6	40,8	*436,8*		40,8	69.7	*70,8*						
Valencia (E) 39°29'N	1998	2018											
occupied surface area in Km²	59	68,5	*16,1*	**0,5**									Murgui, com. pers.; Murgui, 2022
% of 0,5 km squares occupied	56,1	65,2	*16,2*										
Caltanissetta (I) 37°29'N	2006	2020											
occupied surface area in Km²	8,75	13,1	*49,7*	**0,3**									Falci, com. pers.; Nardo *et al.*, 2023
% of 0,5 km squares occupied	57,3	90,4	*57,7*										

Collared Dove, on the other hand, is more common in suburban areas. A comparison of the data shown in Tables 1 and 2 would suggest confirmation of the existence of the phenomenon. However, more specific analyses are needed, alongside the ornithological atlas method alone.

In conclusion, we would like to emphasize the value of urban atlases repeated over time, which are useful tools for tracking population dynamics observed over relatively short periods of time. We therefore encourage their use and hope to see an increase in the number of urban ornithological atlases repeated at regular intervals, and greater consistency in the methodology for collecting and archiving field data (Dinetti *et al*., 2025).

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