



Common farmland birds in Italy

Update of population trends and Farmland Bird Indicator
for the National Rural Network





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These publications are dedicated to Paolo Boldrighini, Sergio Frugis, Gaspare Guerrieri, Helmar Schenk and Giuseppe Tormen

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European stonechat by Lorenzo Magnolfi

The Farmland Bird Index

Farmland Bird Index (FBI) trends in 2019 once again show a decline, with a loss of value of -25.8% compared to 2000. Species of mountain agricultural habitats (FBI_{pm}) such as pastures and grasslands have also declined by -26.9% over the last 20 years.

As shown in the graph, as many as 16 of the 28 species used to calculate the FBI are in a moderate to strong decline, as are nearly half of those that contribute to the FBI_{pm}.

What does this mean in quantitative terms? At times, percentage values related to long historical series do not accurately capture the real decline in a population, as measured by the loss of individuals over 20 years.

In order to provide a more accurate picture of the ongoing process, as measured annually by the Farmland Bird Index and the index for species of mountain grasslands, we calculated the variation in abundance for each species, in terms of individuals, by using the annual average for each species drawn from the most recent estimates of their Italian populations¹⁻⁴. The size of the population is represented by a range of individuals or breeding pairs (minimum and maximum population size) and by using the minimum and maximum population thresholds we can calculate the minimum and maximum variation in the number of individuals during the timeframe in question. Of course, this is an estimate, but it is a useful way to frame the numerical scope of the process at hand.

What our analysis shows is that over twenty years, the overall loss of individuals for the 41 species we analyzed could range between a minimum of 8 million and a maximum of 14 million birds.

The Italian countryside has been the stage for this dramatic, silent disappearance that took place before our eyes. Not only are we depriving ourselves of beautiful creatures with pleasant songs, we must also acknowledge what this means in terms of habitat degradation and the environment we ourselves live in: common species play a crucial ecological role, and the loss of millions of individuals inevitably leads to the loss or degradation of the ecosystem services to which they make a key contribution.

Population trends at the national scale are an excellent summary of the phenomena that impact overall populations. However, it is also worth examining trends at a smaller scale, comparing different ecosystems such as those of the lowlands and the mountains. By comparing trends in the FBI indicator in lowland areas, hilly areas, Mediterranean hills, and the Apennines, we can clearly see that declines have been much more drastic in lowland areas than in the others. The type of agriculture practiced in the lowlands, which is mainly intensive, highly mechanized, and with a heavy input of chemical fertilizers and pesticides on farms that are much larger than those in mountain areas is probably the main reason behind this discrepancy. Hilly and mountain areas such as the Apennines show declines that are

not quite as drastic, but that seem to have been constantly getting worse since 2011. This could be due to two opposite phenomena working in tandem to achieve the same negative result: the increase in intensive farming in mountain areas coupled with the abandonment of less productive areas, exacerbated by climate change. Mediterranean hilly areas seem to enjoy a more stable situation, but they are vulnerable to climate change, which could have a very significant impact in the near future according to projections made by the Euro-Mediterranean Centre on Climate Change (CMCC)⁵.

Italian Sparrow

The Italian Sparrow is almost endemic to Italy - which therefore has a huge responsibility in terms of its global conservation - has declined by 58% between 2000 and 2019 for an overall loss of between 3 and 4.5 million individuals

Skylark

This once-abundant species has been declining steadily for decades. During the 20-year period we analyzed it has experienced an average annual decline of 3.51%: the population went from probably 1.2-1.7 million individuals in 2000 to 600,000-860,000 in 2019.

Stonechat

This small songbird lives in open areas and is very sensitive to agricultural intensification. It nests in meadows and pastures, including those with a moderate presence of shrubs, especially in mountain areas. In the last two decades it has declined by an average of 2.89% per year. Its total population has declined by 13,000 - 20,000 individuals, from an estimated 31,000 - 46,000 individuals in 2000 to 18,000 - 27,000 in 2019.



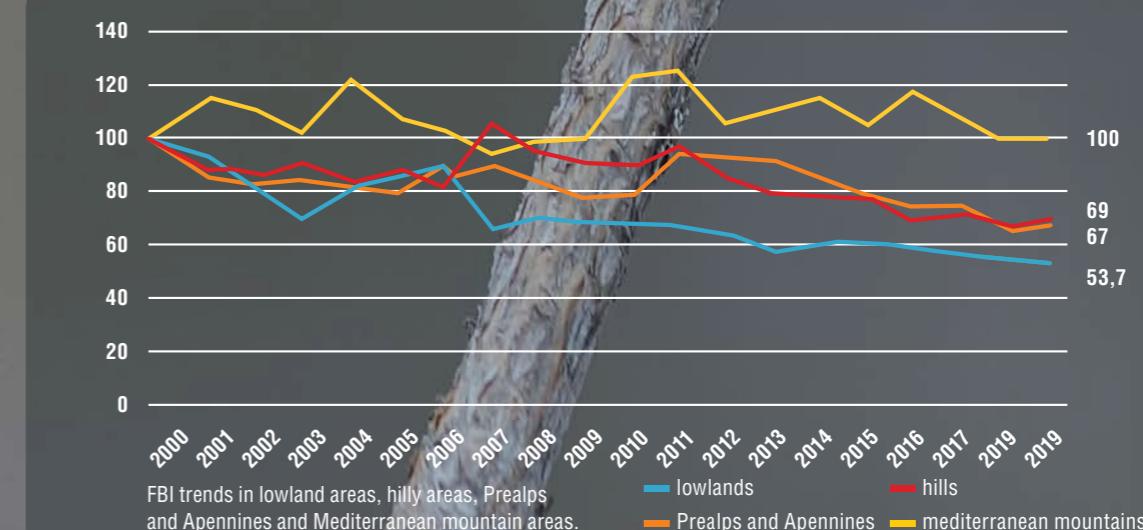
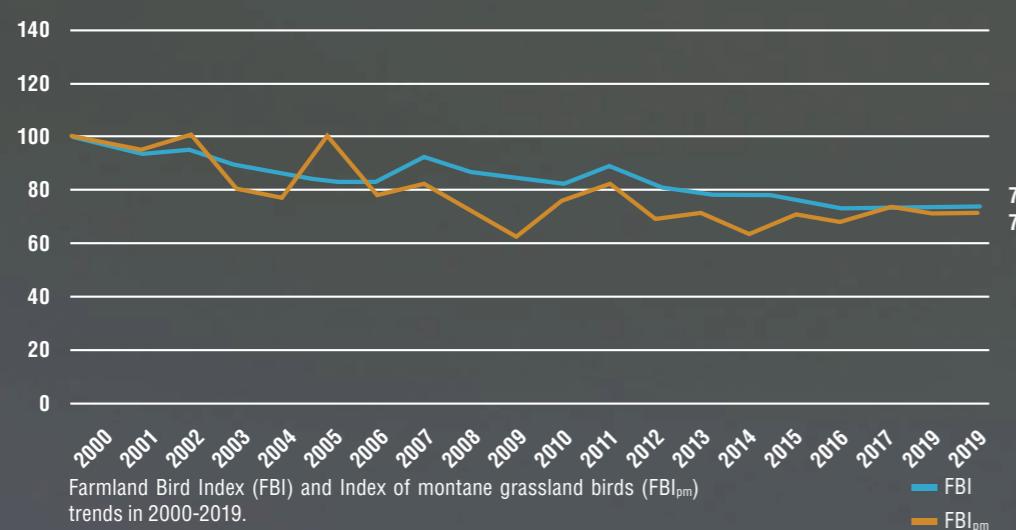
¹ BirdLife International, 2017. European birds of conservation concern: populations, trends and national responsibilities. Cambridge, UK: BirdLife International

² Brichetti P. & Fracasso G., 2003-2013. Ornithologia Italiana, Volumi 1, 4, 5, 6, 7, 8, 9 Alberto Perdisa Editore, Bologna

³ Brichetti P. & Fracasso G., 2020. The birds of Italy. Volume 2. Edizioni Belvedere, Latina

⁴ Ispra & Lipu. Reporting art. 12 Direttiva Uccelli (2013-2019). Dati ined.

⁵ www.cmcc.it/it/analisi-del-rischio-i-cambiamenti-climatici-in-italia



The state of lowland areas in Italy

Indicators linked to birds are able to detect differences in land management and evolution and distinguish agricultural systems on the basis of their effects on biodiversity. The Farmland Bird Index makes it possible to quickly and effectively assess the health of the farmland avifauna, but it can also be extended to the ecosystem as a whole and its biodiversity, including humans, given how representative and sensitive birds are.

Between 2000 and 2019 the indicator declined by 25.8% at the national scale, with an even more worrying 46.3% decline in lowland areas (the vast majority of which fall within the Po Plain). This means that over the last twenty years, nearly half of the birds breeding in our lowland areas have disappeared. The alarming crash in the breeding populations of typical lowland species such as Skylarks, Red-backed Shrikes, Yellow Wagtails, Barn Swallows, Wrynecks and Stonechats at both the national and lowland scale has been proceeding uninterrupted for even longer, and it is a sign that we can no longer neglect. This ongoing process does not just lead to the disappearance of millions of birds: the same causes behind these population declines also impact the environment, biodiversity as a whole, and ultimately, human health as well.

Rural Development Programmes and agricultural policies play a key role in solving the conflict between conservation and production in a sustainable manner and with an eye towards stemming biodiversity declines. A study conducted several years ago in Emilia-Romagna as part of this project¹ showed that the agri-environmental measures of the previous planning species were only effective for small number of species, mostly generalists, which benefited from the measures that helped conserve or increase the structural diversity of the agricultural landscape.

The creation of hedgerows, lines of trees, and woodlots affected the presence of a number of species, all the more so in habitats that were highly uniform (the oasis-in-the-desert effect). Some of the species favoured by these interventions included the Nightingale, Greenfinch and Turtle Dove, while Barn Swallows also responded positively to the restoration of wetland areas and scrubland with clearings, which are its favourite foraging habitats in lowland areas. The application of measures on organic farming had a significant positive effect on the Stonechat and Red-backed Shrike; this might be due to a reduction in the use of pesticides, and in vineyards and orchards to an increase in grassy vegetation between the vines or fruit trees. Finally, the measure on extensive grassland crops favoured two species in strong decline and typical of these habitats, the Skylark and Stonechat, for were more likely to be present and to have increasing populations in areas subject to these measures.

However, both the current and the previous planning periods lack any measures addressing the specific needs of highly specialized species, especially those living in croplands, such as Skylarks and Yellow Wagtails, whose populations in Italy's lowlands have literally collapsed. In fact, similar analyses carried out elsewhere in Europe have led to the conclusion that the current biodiversity conservation tools included in rural development plans must be revised, especially in areas where agriculture is prevalently intensive²⁻³.

Fortunately, it is not too late to redress this shortcoming in the future planning period that will enter into force in 2023, especially through the National Strategic Plan for the CAP. The implementation of interventions to restore populations and habitats that are designed around the real ecological needs of target species can no longer be delayed.



¹ Calvi G. et al., 2019. Evaluating the benefits of agri-environment schemes on farmland bird communities through a common species monitoring programme. A case study in northern Italy. Agricultural Systems 160: 60-69

² Batáry P. et al., 2015. The role of agri-environment schemes in conservation and environmental management. Conservation Biology Vol. 29, n. 4: 1006-1016

³ Dicks L.V. et al., 2014. Farmland Conservation: Evidence for the effects of interventions in northern and western Europe. Vol. 3. Pelagic Publishing Ltd

Population trends between **2000** and **2019**

The table on the following page shows population trends of common birds in Italy between 2000 and 2019; these are the species used to calculate the Farmland Bird Index (FBI) and the Index of montane grassland birds (FBI_{nm}) at the national level.

Species name (common name) and the **Scientific** name are given in the first two columns. In order to make the information contained in the table more legible and accessible, the species are listed alphabetically by common name and not in taxonomic order.

Average annual variation \pm SE (%) represent the average percentage change per year with its standard error (SE). The standard error is a measure of the inaccuracy of the index, and thus is a proxy for its reliability, over the entire monitoring period.

Trend classification 2000-2019 describes, with the use of arrows and colours, population trends classified as follows (definitions recommended by EBCC):

- ***strong increase*** ▲▲ a trend slope of >1.0 ; (an increase of more than 5% per year), with the lower confidence limit of the slope >1.05 ;
 - ***moderate increase*** ▲ a trend slope between 1.00 and ≤ 1.05 (an increase of no more than 5% per year), with the lower confidence limit of the slope between 1.00 and 1.05;
 - ***stable*** ● a trend slope where the confidence intervals overlap 1 (no significant change), with the lower confidence limit of change >0.95 and upper confidence limit of change <1.05 ;
 - ***moderate decline*** ▼ a trend slope of ≥ 0.95 and 1.00 (a decline of no more than 5% per year), with the upper confidence limit of the slope between 0.95 and 1.00;

- *steep decline* a trend slope of <0.95 decline of more than 5% per year), with the upper confidence limit of the slope <0.95 ; A low number of individuals recorded and/or high standard error can make these trends non-significant. Should this happen, the population is prudentially categorized in the lower category for positive trends (*moderate increase instead of strong increase, stable instead of moderate increase*) or in the higher one for negative trends (*moderate decline instead of steep decline, stable instead of moderate decline*).
- *uncertain* ? a trend slope where the confidence intervals overlap 1 (no significant change), with the lower confidence limit of change <0.95 and/or the upper confidence limit of change >1.05 .

The **Squares** column reports the number of 10x10 km squares from which data was used to calculate trends for each species, namely the number of squares visited at least twice between 2000-2019 in which the species in question was recorded. This makes it possible to compare sample size between species. A total of 1,362 10x10 km squares were used for the analyses.

The **Indicator** column divides bird species on the basis of their habitat preferences at the national scale:

- species of farmland habitats whose population trends are used to calculate the Farmland Bird Index (*FBI*),
 - species used to calculate the Index montane grasslands birds (*FBI_{om}*).

In order to provide as exhaustive a picture as possible, we also included additional information, drawn from other studies conducted at the national level, on the species for which



the project presents population trends. The **Conservation status** column provides information on each species' conservation status as follows:

- **Favourable conservation status**
Stable or expanding range and population number of pairs and demographic parameters showing no signs of concern, habitat quality and extension are compatible with the species long-term survival;
 - **Inadequate conservation status**
The population or range has declined over the last 10 years (no more than 10%), or the population/range is highly concentrated/fragmented, fluctuating, or lower than the favourable reference values, and/or the extent of their habitat appears to be insufficient with the species long-term survival;
 - **Poor conservation status**
The population or range has declined significantly, or have fallen by more than 10% in the last ten years, or the population is significantly lower than the favourable population reference

values, and/or their habitat has been significantly degraded or reduced.

For more information on the methodology used for defining the conservation status of Italian birds see these publications^{1,2}

Finally, the **Red List** columns indicates the threat status for every species in the 2019 Red List of Italian breeding birds: Critical (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Data Deficient (DD), Least Concern (LC). The threat categories VU, EN and CR are applied – in ascending order from least to most serious – to the species that have a high to critical level of extinction at the national level in the short or middle term; NT is applied to species at concrete risk of qualifying for a threat category in the near future; DD is applied to species for which there is not enough data to evaluate their risk of extinction; LC is applied to species that are not under immediate threat of extinction (but they can still be slowly declining and/or relatively rare). For more information on the categories and criteria used to compile the national Red List please see the relevant publication³.

¹Brambilla M., Gustin M., Celada C., 2013. Species appeal predicts conservation status. Biol. Conserv. 160, 209-213.

²Gustin, M., Brambilla, M., Celada, C., 2016. Stato di
in Italia. Rivista Italiana di Ornitologia, 86 (2), 3-58

³Gustin M., Nardelli R., Brichetti P., Battistoni A., Rondinini C., Teofili C. (compilatori), 2019. *Lista Rossa IUCN degli uccelli nidificanti in Italia 2019*. Comitato Italiano IUCN e Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Roma

Species name	Scientific name	Annual change ± SE (%)	Trend classification 2000-2019	Squares	Indicator	Conservation status	Red List
Barn Swallow	<i>Hirundo rustica</i>	-1.52 (±0.17)	▼	1259	FBI	NT	
Black Redstart	<i>Phoenicurus ochruros</i>	1.38 (±0.30)	▲	575	FBI _{pm}	LC	
Calandra Lark	<i>Melanocorypha calandra</i>	-2.57 (±1.08)	▼	78	FBI	VU	
Carrion Crow	<i>Corvus corone</i>	-0.60 (±0.55)	●	222	FBI _{pm}	LC	
Common Kestrel	<i>Falco tinnunculus</i>	0.38 (±0.24)	●	1125	FBI	LC	
Common Nightingale	<i>Luscinia megarhynchos</i>	0.21 (±0.14)	●	1042	FBI	LC	
Common Redpoll	<i>Acanthis flammea</i>	-6.90 (±0.94)	▼▼	93	FBI _{pm}	VU	
Common Starling	<i>Sturnus vulgaris</i>	0.13 (±0.24)	●	895	FBI	LC	
Corn Bunting	<i>Emberiza calandra</i>	1.10 (±0.20)	▲	818	FBI	LC	
Crested Lark	<i>Galerida cristata</i>	-1.11 (±0.21)	▼	515	FBI	LC	
Dunnock	<i>Prunella modularis</i>	-0.75 (±0.51)	●	185	FBI _{pm}	NT	
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	2.44 (±0.21)	▲	859	FBI	LC	
Eurasian Hoopoe	<i>Upupa epops</i>	-0.45 (±0.25)	●	848	FBI	LC	
Eurasian Magpie	<i>Pica pica</i>	2.12 (±0.14)	▲	1049	FBI	LC	
Eurasian Skylark	<i>Alauda arvensis</i>	-3.51 (±0.22)	▼	742	FBI	NT	
Eurasian Tree Sparrow	<i>Passer montanus</i>	-2.63 (±0.23)	▼	1005	FBI	LC	
Eurasian Wryneck	<i>Jynx torquilla</i>	-6.47 (±0.43)	▼▼	572	FBI	EN	
European Goldfinch	<i>Carduelis carduelis</i>	-2.80 (±0.13)	▼	1319	FBI	LC	
European Greenfinch	<i>Chloris chloris</i>	-3.09 (±0.16)	▼	1202	FBI	NT	
European Serin	<i>Serinus serinus</i>	-0.16 (±0.13)	●	1258	FBI	LC	
European Stonechat	<i>Saxicola rubicola</i>	-6.79 (±0.26)	▼▼	919	FBI	EN	
European Turtle Dove	<i>Streptopelia turtur</i>	-1.18 (±0.16)	▼	1021	FBI	LC	
Fieldfare	<i>Turdus pilaris</i>	-3.47 (±0.72)	▼	108	FBI _{pm}	NT	
Garden Warbler	<i>Sylvia borin</i>	-5.60 (±1.00)	▼	106	FBI _{pm}	VU	
Greater Short-toed Lark	<i>Calandrella brachydactyla</i>	-0.49 (±0.89)	●	137	FBI	NT	
Hooded Crow	<i>Corvus cornix</i>	0.88 (±0.13)	▲	1233	FBI	LC	
Italian Sparrow	<i>Passer italiae</i>	-3.21 (±0.16)	▼	1148	FBI	NT	
Lesser Whitethroat	<i>Sylvia curruca</i>	1.69 (±0.80)	▲	136	FBI _{pm}	LC	
Northern Wheatear	<i>Oenanthe oenanthe</i>	-0.67 (±0.50)	●	223	FBI _{pm}	LC	
Ortolan Bunting	<i>Emberiza hortulana</i>	-0.47 (±1.04)	●	109	FBI	VU	
Red-backed Shrike	<i>Lanius collurio</i>	-4.41 (±0.29)	▼	798	FBI	VU	
Ring Ouzel	<i>Turdus torquatus</i>	-0.74 (±0.95)	●	101	FBI _{pm}	LC	
Spanish Sparrow	<i>Passer hispaniolensis</i>	-2.63 (±0.38)	▼	165	FBI	LC	
Spotless Starling	<i>Sturnus unicolor</i>	4.63 (±0.59)	▲	149	FBI	LC	
Tawny Pipit	<i>Anthus campestris</i>	-4.58 (±0.61)	▼	212	FBI	VU	
Tree Pipit	<i>Anthus trivialis</i>	0.53 (±0.40)	●	293	FBI _{pm}	LC	
Water Pipit	<i>Anthus spinolella</i>	-1.31 (±0.48)	▼	141	FBI _{pm}	LC	
Western Yellow Wagtail	<i>Motacilla flava</i>	-2.21 (±0.34)	▼	318	FBI	LC	
Whinchat	<i>Saxicola rubetra</i>	-2.89 (±0.81)	▼	131	FBI _{pm}	VU	
White Wagtail	<i>Motacilla alba</i>	-1.04 (±0.23)	▼	1062	FBI	LC	
Yellowhammer	<i>Emberiza citrinella</i>	-3.07 (±0.54)	▼	227	FBI _{pm}	VU	



The FBI indicator at a regional scale

The European Union's Common Agricultural Policy accounts for about 40% of the EU's total budget and rests upon two pillars: the first comprises direct payments to farmers together with market measures for certain specific sectors, while the second finances multi-year rural development plans. Rural development programmes include support for farmers who undertake to invest and act on behalf of the environment and to adopt sustainable practices. In Italy, rural development policy is set at the regional level through seven-year Rural Development Programmes (RDPs). For this reason, the indicators used to monitor and evaluate RDPs are calculated at a regional scale within the framework of each RDP. Indicator C.35 - Farmland Bird Index is thus produced at both the national and regional scale.

The application of RDPs at the regional scale means that 21 regional or provincial indicators (for the autonomous provinces of Trento and Bolzano) must be calculated. Italy is a highly diverse country in terms of its landscapes and habitats, with great topographic and climatic variety, and as a consequence farming systems that differ significantly from one area to the next. This diversity, which is one of Italy's assets, has meant that each region has its own typical farm products, which have in turn shaped agricultural landscapes and their ecosystems. Regional-scale analyses make it possible to capture this extreme diversity by working at a finer scale.

The first step in calculating regional indicators was to identify the subset of farmland birds for each region or province, which subsets were different from those used to calculate the Farmland Bird Index at the national scale. As a testament to the high biodiversity of Italian agricultural ecosystem, no less than 89 species were included in at least one of the 21 regional and provincial lists, versus 28 species used to calculate the national FBI. Some examples can help highlight the usefulness of this approach in precisely defining the bird communities of regional farmland ecosystems. The Short-toed Treecreeper, a typical forest species, is also a widespread breeder in extensive olive groves in Apulia, and as such it has been considered a farmland bird in that region since it is associated

with one of its main agricultural ecosystems. At the same time, in some regions certain species that are used to calculate the national FBI have been excluded, since they do not occur there: this is the case, for instance, with Crested Lark and Common Starling in Sardinia.

Species taken into consideration for compiling regional lists included both locally common ones, which are considered to be the project's target species, and species of conservation interest, for which the methodology used in this project is not the ideal one to monitor breeding populations. Examples of the latter include Stone Curlew and Little Bustard in Sardinia, or Lesser Kestrel in Apulia, Basilicata and Sicily. For these species, it is crucial to have reliable population trends for each region where they occur. Depending on the case at hand, it is necessary to implement dedicated project or support existing ones, so that they may produce in the future population indexes to be incorporated into the local indicators.

By the same token, regional analyses have made it possible to identify areas and species that should be targeted for additional sampling in order to have a more representative picture of population trends for locally important breeding species. This was partly carried out during the project with the resumption of data collection in areas sampled in the past, thus augmenting the dataset used in the analyses. Together with a longer historical series, this has significantly improved the results in terms of the number of species with well-defined population trends.

The most interesting aspect of the analyses carried out at the regional and provincial scales is the opportunity of obtaining a sort of spatialization of population trends. For many species, it has been possible to draft distribution maps for the trends and to understand better and in more details some of the ongoing population dynamics. There are species for which we can observe a general population decline or increase in all or most of Italy, such as Stonechat and Red-backed Shrike, which are declining nationwide, or Eurasian Magpie and Cirl Bunting, which are increasing. There are other species for which there are patterns of spatial variation in population trends. This is the case for the Eurasian Skylark and European Greenfinch,

whose populations are declining more steeply in the Po Plain than elsewhere, or for the Crested Larks, which is experiencing its worst population declines in its southern Italian strongholds.

This is very important information, since it makes it possible to understand population dynamics for Italian farmland birds in a detailed and spatially explicit manner. It will have to be taken into account when drafting measures and actions for the next Rural Development Programme. Indeed, numerous studies - some of which undertaken within the framework of this project

- have highlighted the need to draft biodiversity support measures tailored to the specific ecological needs of target species. Such actions are more effective than more generalized or broader ones: the latter mostly favour habitat generalists and not those more strictly tied to specific agricultural habitats such as meadows, pastures or farmland mosaics. But it is exactly these specialized species whose conservation status is currently in jeopardy, and they require stronger support and protection through the implementation of concrete and effective conservation actions.



Black redstart by Lorenzo Magnolfi

Dunnock by Roberto Beccucci

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