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2015

Common farmland birds in Italy

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

LIPU

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

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Eurasian skylark by Lorenzo Magnoli

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The English and Italian versions of this brochure, with the technical reports in Italian, can be downloaded from:
www.reterurale.it/farmlandbirdindex

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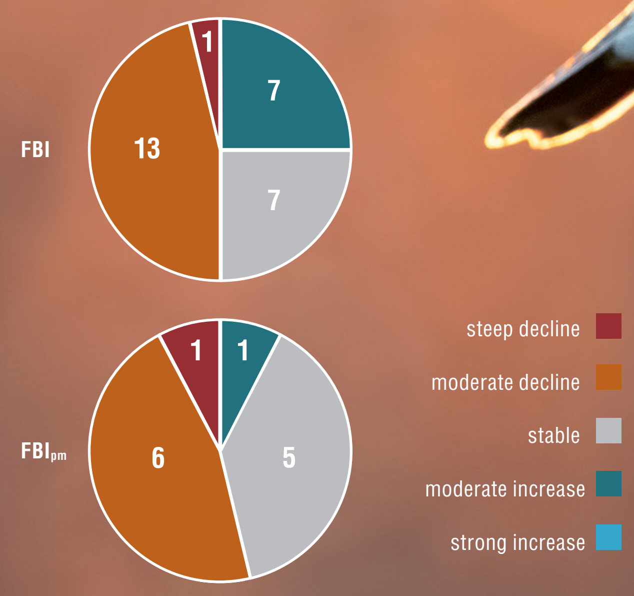
European goldfinch by Dario Mingardi

The **Farmland Bird Index**

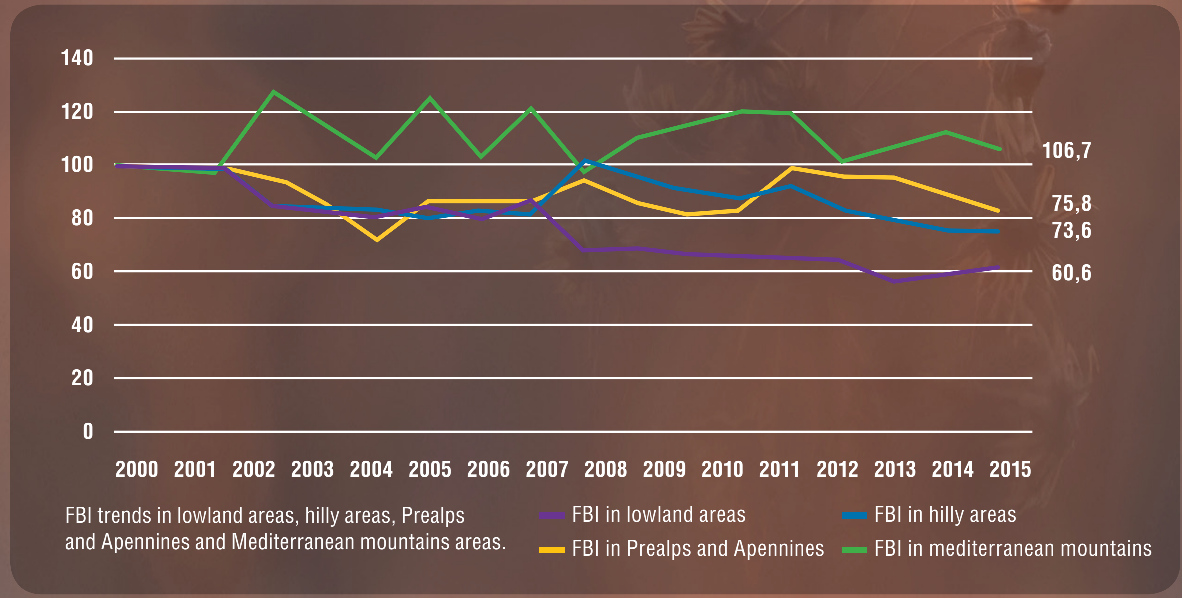
In statistics, aggregate (or composite) indicators are used to provide a summary of data. This is the case with the Farmland Bird Index (FBI), which makes it possible to assess the population indexes of a group of 28 bird species tied to agricultural ecosystems, allowing us to understand the overall population trends of the bird communities that live in these habitats. This indicator gives us an instant picture of the health of the farmland avifauna, and can be extended more broadly to the health of agricultural ecosystems and their biodiversity, including humans.
As part of its 2014-2020 planning for the Common Agricultural Policy, the EU has confirmed its use of the Farmland Bird Index as a suitable indicator to assess the health of European and national agricultural ecosystems (context indicator C35 in Annex IV of Regulation EU n. 808/2014).
The FBI indicator was used by Italy's National Rural Network to describe the context within which the National Rural Development Plan (*Programma di sviluppo rurale nazionale* - PSRN) operates. Since 2009, FBI indicators are also being calculated at the regional level: regional technical reports can be downloaded from http://www.reterurale.it/farmlandbirdindex.
Compared to 2014, the Farmland Bird Index has declined by another 3 percentage points (-21.2% compared to 2000), confirming a trend towards an increasingly marked decline.
Species of pseudo-steppe habitats and of highly diversified farmland with semi-natural elements such as hedgerows, woodlots, and small fallow areas have shown the most evident declines (Skylark: -52.2%, Greater Short-toed Lark: -39.8%, Tawny Pipit: -63.9% Red-backed Shrike: -48.5%, Wryneck: -67.8%, Stonechat: -54.9%). Out of 28 species, exactly half are declining, while seven are stable and seven are moderately increasing (Eurasian Kestrel, Golden Oriole, Magpie, Hooded Crow, European Starling, Spotless Starling and Corn Bunting: for more details see page 10).
The main causes behind these declines include the loss of suitable habitat and of food resources due both to the expansion of intensive, industrial agriculture, which mainly affects the lowlands, and the abandonment of farming activities in mountain and marginal areas. The Farmland Bird Index for lowland areas, where intensive agriculture dominates, shows a much more negative trend compared to the FBI for Italy as a whole, with a 39% decline between 2000 and 2015. Trends remain negative in hilly areas and the Apennines, albeit not as much as in the lowlands, while in Mediterranean hilly areas there has been a slight improvement since 2000 (+6.73%).

Farmland Bird Index (FBI) and Index of montane grassland birds (FBI_{pm}) trends in 2000-2015.

The index of montane grasslands birds (FBI_{pm}) has declined by about -26% compared to 2000. In more detail for this indicator five species show stable population trends, six are in moderate decline, one is in strong decline, and only one is increasing.



Population trends of the species used to calculate the aggregate indicators



FBI trends in lowland areas, hilly areas, Prealps and Apennines and Mediterranean mountains areas.

European stonechat by Lorenzo Magnolfi

The causes of **bird declines** in agricultural areas

Eurasian tree sparrows by Franco Fratini

Italy has 16.5 million hectares of agricultural land, of which nearly 12.6 million are being used, comprising 42% of the national territory. The agricultural sector thus has a major impact on Italy's landscape. The main agricultural practices and activities that damage natural habitats and biodiversity are those associated with widespread industrial farming, which is characterized by extensive monocultures that damage diversity and impoverish the landscape. Larger farms lead to a significant reduction in edge habitats that are essential for wild flora and fauna, including many bird species that use these habitats for nesting and feeding. The disappearance of certain traditional elements of the rural landscape, such as fallow fields, hedgerows, lines of trees, and small wetlands also leads to the loss of crucial micro-habitats, leading to a decline in bird populations and in biodiversity in general. In addition to causing the loss of habitat and of opportunities for the local flora and fauna, intensive agriculture is often also responsible for environmentally unsustainable practices. These include the reduction of crop rotation, which had been used by farmers since ancient times to improve soil fertility, and it replacement by the intensive use of chemical fertilizers.

The Farmland Bird Index project focuses on the nesting season for its target species, which comprise common breeding species of agricultural habitats. It should not be forgotten that winter, due to the lack of food and the cold temperatures that require a high nutrient intake, is also a crucial season for resident species, especially in resource-poor habitats such as the Italian countryside. Improvements in crop harvesting efficiency and changes in the crop varieties being cultivated (such as the shift from spring-summer grains to fall-winter ones), which are responsible for the loss of crop rotation and of typical winter habitats such as stubble fields – a traditional element of the wintertime countryside – make it more difficult for wintering birds to search for seeds and other food. Increasing extensions of ploughed and cultivated areas can also have a dramatic impact on invertebrate abundance, especially when pesticides and herbicides are used.

Changes in cereal planting and harvesting periods have also reduced the availability of nesting habitat for Lapwings, and of shelter for other breeding birds such as Skylarks, Yellow Wagtails, and Corn Buntings. With its impact on both the farming calendar and the phenology of birds and their prey, climate change could further jeopardize the already previous balance between the farming calendar and the lifecycle of many species.

Finally, an approach to farming that focuses exclusively on profits and on maximizing yields has had a negative effect on the quality of meadows, pasture land, and Mediterranean steppe, the last-named of which has almost entirely disappeared due to irrigation and the removal of stones. A large proportion of Italy's wetlands had already met the same fate in the past, due to the many draining efforts that took place nationwide to increase the extent of farmland. Meadows and pastures have seen an increase in grazing, higher nutrient input, re-seeding, and a shift away from hay farming, losing much of their ecological role and their plant and animal communities in the process.

Nevertheless, the abandonment of extensive farming can also put our environmental heritage at risk, including several habitats considered particularly valuable by the European Union: as the countryside is abandoned, semi-natural meadows and pastures of great environmental importance risk disappearing, reducing the continent's carrying capacity for biodiversity.

All of these factors simultaneously impact habitats and species, and underpin the decline in farmland bird populations. The loss of diversified agricultural ecosystems is a complex, multi-faceted problem that must be tackled at both the central (European) and local (regional) levels, under penalty of losing biological wealth, ecosystem functionality, and landscape beauty.

Population trends between **2000** and **2015**

The table on the following page shows population trends of common birds in Italy between 2000 and 2015; these are the species used to calculate the Farmland Bird Index (FBI) and the Index of montane grasslands birds (FBIpm), 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 ± SE (%) represents 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 2000-2015 describes, with the use of arrows and colours, population trends classified as follows (definitions recommended by EBCC):

• *strong increase* ▲▲ a trend slope of >1.05 (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 (a 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 a 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 in 2000-2015 in which the species in question was recorded. This makes it possible to compare sample size between species. A total of 1.160 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 of montane grasslands birds (FBI_{pm}).
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:
The **Conservation status** column provides information on each species' conservation status as follows:

• *Favourable conservation status* (green)
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* (yellow)
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* (red)
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 that 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 2011 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 of 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 publication[3].

Dunnock by Davide Ferretti

[1] Brambilla M., Gustin M., Celada C., 2013. Species appeal predicts conservation status. Biol. Conserv. 160, 209–213
[2] Gustin, M., Brambilla, M., Celada, C., 2016. Stato di conservazione e valore di riferimento favorevole per le popolazioni di uccelli nidificanti in Italia. Rivista Italiana di Ornitologia, 86 (2), 3-58
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Population trends between **2000** and **2015**

Species name	Scientific name	Annual change ± SE (%)	Trend classification 2000-2015	Squares	Indicator	Conservation status	Red List
Barn Swallow	*Hirundo rustica*	-1.37 (±0.24)	Moderate decline	1144	FBI	Poor	NT
Black Redstart	*Phoenicurus ochruros*	1.48 (±0.41)	Moderate increase	488	FBI_{pm}	Favourable	LC
Calandra Lark	*Melanocorypha calandra*	-0.94 (±1.40)	Stable	69	FBI	Poor	VU
Carrion Crow	*Corvus corone*	-1.73 (±0.78)	Moderate decline	183	FBI_{pm}	Favourable	LC
Common Kestrel	*Falco tinnunculus*	1.05 (±0.33)	Moderate increase	995	FBI	Favourable	LC
Common Nightingale	*Luscinia megarhynchos*	0.02 (±0.20)	Stable	952	FBI	Favourable	LC
Common Redpoll	*Acanthis flammea*	-6.42 (±1.21)	Moderate decline	83	FBI_{pm}	Favourable	LC
Common Starling	*Sturnus vulgaris*	0.84 (±0.33)	Moderate increase	797	FBI	Favourable	LC
Corn Bunting	*Emberiza calandra*	1.50 (±0.28)	Moderate increase	753	FBI	Inadequate	LC
Crested Lark	*Galerida cristata*	-1.38 (±0.29)	Moderate decline	470	FBI	Inadequate	LC
Dunnock	*Prunella modularis*	-1.18 (±0.64)	Stable	170	FBI_{pm}	Favourable	LC
Eurasian Golden Oriole	*Oriolus oriolus*	3.80 (±0.30)	Moderate increase	756	FBI	Favourable	LC
Eurasian Hoopoe	*Upupa epops*	0.40 (±0.36)	Stable	758	FBI	Favourable	LC
Eurasian Magpie	*Pica pica*	2.26 (±0.20)	Moderate increase	945	FBI	Favourable	LC
Eurasian Skylark	*Alauda arvensis*	-4.28 (±0.30)	Moderate decline	675	FBI	Poor	VU
Eurasian Tree Sparrow	*Passer montanus*	-3.00 (±0.33)	Moderate decline	907	FBI	Poor	VU
Eurasian Wryneck	*Jynx torquilla*	-6.60 (±0.56)	Steep decline	501	FBI	Inadequate	EN
European Goldfinch	*Carduelis carduelis*	-2.80 (±0.18)	Moderate decline	1220	FBI	Inadequate	NT
European Greenfinch	*Chloris chloris*	-3.44 (±0.22)	Moderate decline	1097	FBI	Inadequate	NT
European Serin	*Serinus serinus*	0.06 (±0.18)	Stable	1155	FBI	Favourable	LC
European Stonechat	*Saxicola rubicola*	-5.80 (±0.34)	Moderate decline	841	FBI	Inadequate	VU
European Turtle Dove	*Streptopelia turtur*	-0.28 (±0.22)	Stable	929	FBI	Poor	LC
Fieldfare	*Turdus pilaris*	-4.66 (±0.85)	Moderate decline	97	FBIpm	Inadequate	NT
Garden Warbler	*Sylvia borin*	-9.35 (±1.36)	Steep decline	88	FBIpm	Inadequate	LC
Greater Short-toed Lark	*Calandrella brachydactyla*	-3.28 (±1.00)	Moderate decline	114	FBI	Poor	EN
Hooded Crow	*Corvus cornix*	1.26 (±0.19)	Moderate increase	1137	FBI	Favourable	LC
Italian Sparrow	*Passer italiae*	-3.96 (±0.23)	Moderate decline	1076	FBI	Poor	VU
Lesser Whitethroat	*Sylvia curruca*	0.79 (±1.04)	Stable	119	FBI_{pm}	Favourable	LC
Northern Wheatear	*Oenanthe oenanthe*	0.45 (±0.63)	Stable	206	FBI_{pm}	Poor	NT
Ortolan Bunting	*Emberiza hortulana*	1.48 (±1.24)	Stable	94	FBI	Poor	DD
Red-backed Shrike	*Lanius collurio*	-4.32 (±0.38)	Moderate decline	724	FBI	Poor	VU
Ring Ouzel	*Turdus torquatus*	-0.11 (±1.31)	Stable	88	FBI_{pm}	Inadequate	LC
Spanish Sparrow	*Passer hispaniolensis*	-4.88 (±0.51)	Moderate decline	162	FBI	Inadequate	VU
Spotless Starling	*Sturnus unicolor*	4.91 (±0.73)	Moderate increase	144	FBI	Favourable	LC
Tawny Pipit	*Anthus campestris*	-3.56 (±0.82)	Moderate decline	191	FBI	Poor	LC
Tree Pipit	*Anthus trivialis*	-0.71 (±0.52)	Stable	260	FBI_{pm}	Inadequate	VU
Water Pipit	*Anthus spinoletta*	-2.09 (±0.67)	Moderate decline	130	FBI_{pm}	Inadequate	LC
Western Yellow Wagtail	*Motacilla flava*	-2.86 (±0.48)	Moderate decline	270	FBI	Inadequate	VU
Whinchat	*Saxicola rubetra*	-4.18 (±1.09)	Moderate decline	112	FBI_{pm}	Poor	LC
White Wagtail	*Motacilla alba*	0.18 (±0.31)	Stable	957	FBI	Inadequate	LC
Yellowhammer	*Emberiza citrinella*	-2.75 (±0.69)	Moderate decline	206	FBI_{pm}	Poor	LC

MODERATE INCREASE · STRONG INCREASE · MODERATE DECLINE · STEEP DECLINE · STABLE · UNCERTAIN ? · FAVOURABLE · POOR · INADEQUATE

Italian hilly landscape by Saverio Barchiesi

The invisible danger:
the European and Italian response to the **impact of pesticides**

European and Italian Farmland Bird Index trends show sometimes dramatic population declines in many species, especially highly specialized ones. The negative trend for farmland biodiversity is confirmed by data on other taxa, with invertebrates foremost among them: the Butterfly Index indicator shows a 39% decline in Europe since 1990[1], while a study carried out in the German countryside showed that arthropod biomass declined by over 75% between 1990 and the present[2]. Unfortunately, similar data at the national level is still lacking, but numerous local studies reached similar conclusions.

As we know, there are multiple causes behind these declines, but the use of pesticides is one of the main culprits. Numerous studies show how these substances have direct and indirect impacts on wildlife, starting with pollinators and extending up the food chain to birds.

Although statistics indicate that total sales of pesticides in Italy have been declining[3], the country remains one of Europe's leading pesticide consumers. According to the European Environmental Agency's latest report, in the EU the average consumption of pesticides is 3.8 kg per hectare, which in Italy increases to 5.5 kg per hectare[4]. Cross-referencing data at the regional scale shows that the areas with the highest pesticide consumption are also those with the steepest declines in the FBI.

A more direct measurement of the extent to which these substances have been dispersed in the environment and have entered the food chain comes from ISPRA's latest report on water quality, published in 2020. This document shows a significant increased in sampling points contaminated by pesticides or their metabolites, in both surface and underground water destined for human consumption: between 2012 and 2018, contaminates sites increased by 35% for surface water and by 14% for ground water[5].

In order to mitigate the impacts of these substances on the environment and on humans, in 2009 the European Union issued Directive 2009/128/EC, which establishes a framework for Community action to achieve the sustainable use of pesticides. This directive, which is currently under revision, establishes that each Member State must adopt a five-year action plan and an adequate monitoring system and indicators to evaluate its effects.
Italy has transposed the contents of this directive with Legislative Decree 150/2012, and the Inter-ministerial Decree of 22 January 2014 approved the National Action Plan (Piano di Azione Nazionale - PAN) for the sustainable use of pesticides. The PAN establishes the objectives, measures, modalities, and timeframe for reducing the risks and impacts associated with pesticide use. The general goals of the PAN are to reduce the risks and impacts of pesticides on human health, the environment, and biodiversity, while promoting the application of voluntary integrated pest management and organic agriculture, safeguarding the users of pesticides and the general population, protecting consumers, and conserving aquatic environments, drinking water, biodiversity and ecosystems.
The Italian National Action Plan expired in 2018 and is currently still under revision.
The set of indicators identified by the plan includes one specifically devoted to birds, "Populations of bird species sensitive to pesticides", of which LIPU provided a draft upon request by the National Rural Network (Rete Rurale Nazionale) in 2014[6]. The indicator, which is calculated on the basis of the populations of bird species most affected by pesticides given their feeding and reproductive behaviour, has been regularly declining since

2011, bottoming out in 2014 (63.3% of its value in 2000). Among the species included to calculate the indicator, several are also used to calculate the Farmland Bird Index, including Italian Sparrow, Wryneck, Stonechat and Skylark.

In a parallel effort to assess the impact of pesticides on species and habitats of Community interest, in 2015 ISPRA drafted a report on the hazards of pesticides in Natura 2000 sites, on the basis of estimates of the sensitivity of habitats, flora, and fauna to the direct and indirect effects of pesticides[7]. The analysis shows that great attention must be paid to preventing the impacts of pesticides on sites with aquatic ecosystems, which host the majority of species and habitats potentially threatened by pesticides.

Concerning the protection of aquatic ecosystem and protected areas, the Plan delegated the definition of specific measures to prevent and mitigate the impact of pesticides to a non-binding document approved by the Interministerial Decree of 10 March 2015 “Guidelines for the protection of aquatic ecosystems and drinking water and for reducing the use of pesticides and related risks in specific areas, including Natura 2000 sites and protected areas”[8]. These guidelines are thus a steering document identifying 18 measures to reduce pesticide use and related risks. It is targeted at regional administrations, which are responsible for fleshing them out at a local and site-specific scale. An initial analysis carried out by ISPRA in 2019 showed instead that 98.5% of the measures defined by the regions are merely generic, and thus not in compliance with the guidelines. In practical terms, this means that these measures have been largely ineffective, especially in the areas that required the most attention.

Taken as a whole, the legislative effort made by the European Union and its Member States has not been sufficient to mitigate the impact of pesticides on the environment and human health, as the European Court of Auditors itself admits in its report on the sustainable use of plant protection products[9], which concludes that “there has been limited progress in measuring and reducing the associated risks” of pesticides. The special report notes that “farmers have little incentive to reduce their dependence on pesticides. In particular, the application of integrated pest management principles is not a condition to access CAP payments”.
This has spurred the European Commission to tackle the issue through a series of initiatives, beginning with one focusing on pollinators[10] launched in 2018. Its goal was to raise awareness on the decline of pollinators and to fight its causes. On 18 December 2019 the European Parliament adopted a resolution on the initiative to demand targeted actions to protect wild pollinators. However, this initiative does not yet seem to have brought about any change, as detailed in the European Court of Auditors’ special report on the protection of pollinators[11].

The Commission has thus included the reduction of the impact of pesticides on health and the environment in the European Green Deal, and more specifically in its “Farm to Fork” and “Biodiversity 2030” strategies, which were presented on 20 May 2020. These strategies call for 25% of European agricultural land to be cultivated using organic farming methods, and to reduce pesticide use by 50% by 2030.

The changes that are currently being made to the directive on the sustainable use of pesticides, and its consequences on CAP reform are essential to embark on a new path and reverse biodiversity declines in the European countryside, including the declining bird populations highlighted by the Farmland Bird Index.

Barn swallow by Roberto Becucci

[1] Van Swaay et al., 2019. The EU Butterfly Indicator for Grassland species: 1990-2017: Technical Report. Butterfly Conservation Europe & ABLE/eBMS (www.butterfly-monitoring.net)
[2] Hallmann CA et al., 2017. More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLoSONE 12(10): e0185809
[3] Dati Eurostat 2020. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_consumption_of_pesticides
[4] EEA Environmental indicator report 2018
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[6] Rete Rurale Nazionale & Lipu, 2015. Indicatore Popolazioni di Uccelli sensibili ai prodotti fitosanitari aggiornato al 2014 ISPRA, 2015. Valutazione del rischio potenziale dei prodotti fitosanitari nelle Aree Natura 2000. Rapporti, 216/2015 https://www.reterurale.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17687
[7] ECA, special report 5/2020 Uso sostenibile dei prodotti fitosanitari: limitati progressi nella misurazione e nella riduzione dei rischi
[8] https://ec.europa.eu/environment/nature/conservation/species/pollinators/index_en.htm
[9] ECA, special report 15/2020 La protezione degli impollinatori selvatici nell’UE: le iniziative della Commissione non hanno dato i frutti sperati
[10] https://ec.europa.eu/environment/nature/conservation/species/pollinators/index_en.htm
[11] ECA, special report 15/2020 La protezione degli impollinatori selvatici nell’UE: le iniziative della Commissione non hanno dato i frutti sperati

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