



Biodiversity Check List

 **BASF**

We create chemistry

BASF shows how it works

Getting the balance right between productive farming and nurturing biodiversity

Global challenges such as population growth, climate change, species extinction and the conservation of natural resources are leading to a paradigm shift with regard to the future of farming. Agriculture is not just being impacted by these trends: through innovative solutions it is actively driving the transition towards a more sustainable approach to growing food for future generations.

Two issues are taking center stage in this transformation process: the amount of land available worldwide for both people and farming is continuously shrinking; and farmers must produce healthy food economically on increasingly scarce land while conserving precious resources such as water, soil and biodiversity.

Finding the right balance between food production, climate protection and environmental conservation is key. Besides farmers and policymakers, the agricultural industry also has an important role to play in addressing these challenges. As an industry focused on research and development, it is already investing in innovative crop protection and seed solutions, breeding technologies, digital tools as well as in measures to promote biodiversity that are embedded in agricultural practices. So that the demands placed on agriculture in the future can and will be met.

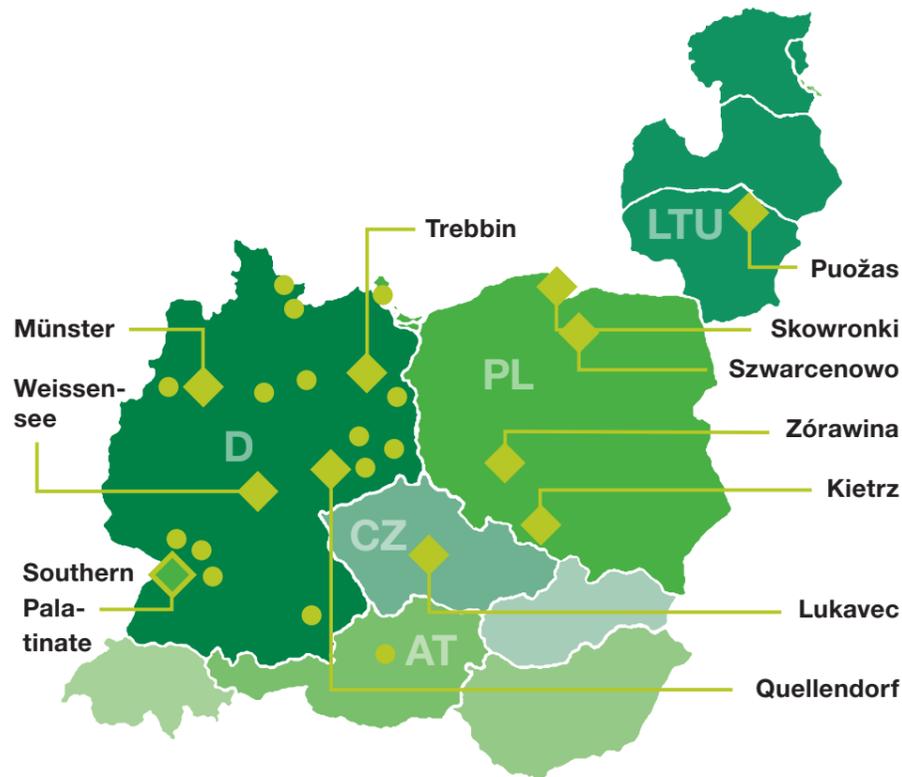
BASF is committed to delivering solutions that contribute towards achieving the right balance between productivity and the protection of natural resources in agriculture.

In concrete terms, the aim is to increase and enhance biodiversity across the board in intensively managed arable landscapes. At the same time, it is about preserving as much productive farmland as possible. This is the only way modern agriculture will rise to the economic, political and societal challenges already on the horizon.

The BASF FarmNetwork

It is against this background that the BASF FarmNetwork project was launched in 2013. Today, 55 farms in Germany are leading the way by experimenting with and implementing effective and practical measures to promote biodiversity without losing sight of productivity.

BASF FarmNetwork Sites



- ◆ Monitored farms in the BASF FarmNetwork
- Farms in the BASF FarmNetwork
- ◆ Conurbation region with 37 farms

Independent outside experts continuously monitor the progress and impact of these measures, and the scientific findings are published in an annual report.

Now in its eighth year, the BASF FarmNetwork is proving that biodiversity can be sustainably promoted in modern, conventional farming. The key is to take land that is less productive to begin and use it to create, maintain and interconnect habitats for fauna and flora.

The Biodiversity Council

However, measures to promote biodiversity have to meet a number of tough criteria. There is often a conflict of interest between practicality and ecological added value. The issue of financial viability, too, plays a key role in the decision to expand biodiversity areas in the agricultural landscape over the long term.

It is for this reason that BASF set up the Biodiversity Advisory Council.

It consists of farmers who represent a diverse spectrum in terms of farm size, type of crops and the methods used, scientists specialized in nature conservation and environmental protection, and communication experts and representatives of NGOs.

As a first step, the Biodiversity Council defined 10 measures for promoting biodiversity. These initiatives, for which funding is available, are presented here in greater detail.



Monitoring wild bee populations, source: BASF



Tagging a female red-backed shrike, source: BASF



Protecting pollinators is vitally important, source: Burger



Great banded furrow-bee on a cornflower, source: Schmid-Egger

BASF Biodiversity Check List

Based on extensive research and experience, BASF and the Biodiversity Council are focusing on 10 measures that make ecological sense and are practical to implement.

Wildflower strips and plots

- The area dedicated to perennial wildflower seeding should cover a minimum of 250 m² (~2,700 sq ft) and be maintained for at least 4 years.
- Seed varieties: Use perennial flower mixes that are also rich in wild herbs; there should be at least 20 different species.
- Maintenance: In the 1st year, a cupping cut at 15 cm before the seeds of undesirable species can ripen; then annually at the end of winter and again from the beginning of July. Proceed in sections when mowing or mulching.



Field margins

- Minimum effective area: 250 m² (~2,700 sq ft), width at least 3 m (~10 ft).
- Refrain from chemical and mechanical weed control.
- Do not use nitrogenous/nitrogen-based fertilizers.



Fallowing

- Minimum effective area: 250 m² (~2,700 sq ft).
- No agricultural production, i.e. no seeding (only spontaneous growth), no harvesting, no fertilizers or crop protection products.
- Ideally non-rotational, at least from after the harvest until 1 August the following year.



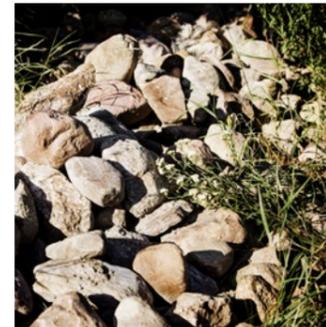
Lucerne, clover grass and red clover

- Minimum effective crop area for lucerne, clover grass and red clover: 250 m² (~2,700 sq ft).
- Ideally on a multi-year cropping basis, or at least from April to late August.
- 250 m² (~2,700 sq ft) of the crop need to reach flowering; if the area is integrated into a large field, mowing should be in sections so that part of the area is always in bloom to serve as a food source for wild bees while raptors use the open areas for foraging.



Field shrubs

- Shrubs recommended for planting include: hawthorn, blackthorn, yellow plum, and field maple.
- Combine shrubs to achieve maximum flowering throughout the year.
- Sites: Avoid overshadowing on south-facing, warm/dry and sparsely vegetated areas (valuable habitats for wild bees).



Structural diversity in the landscape

- Mounds, clearance cairns, deadwood piles, soil break-offs.
- Recommended size for mounds, cairns or deadwood piles: at least 1 m³ (~35 cu ft).
- Break-off edges/scarps: at least 1 m² (~10 sq ft) and 30 cm (~1 ft) high.
- Sites: south-facing, sunny locations.



Skylark plots

- Two skylark plots per hectare (~2.5 acres).
- Plot size: 20 m² (~215 sq ft).
- Establish plots in autumn by leaving the area undrilled. Clearing plots in the spring with herbicides is prohibited!
- Crops: winter cereal (except winter barley).
- Set up clear of tramlines (to reduce predation); at least 50 m (~160 ft) from field edges and at least 150-200 m (~500-650 ft) from tree rows, hedgerows and buildings.



Nesting aids for birds and bats

- Especially useful where there are hardly any old and/or rotting trees or if there are no buildings that offer suitable breeding niches.
- Various types of nest boxes to choose from, depending on bird species.
- Follow recommendations for the respective nest box types.



Lapwing measures

- Only useful if the lapwing is present in the region.
- Minimum size for the fallow area in the field: 0.5 hectare (~1.25 acres).
- Ideally near wet areas/grasslands.



Partridge habitats

- Perennial wildflower seeding.
- Only useful if partridges are present in the region.
- Maintain across multiple years, no mowing/mulching before mid-August.
- Minimum width: 20 m (~65 ft) to mitigate predation.
- Fresh seeding of a small area on an annual basis is recommended (fresh, unmatted vegetation is beneficial to chicks).

Please note that on-site inspections or aerial photography may take place during the project for quality assurance purposes.

Wildflower strips and plots



Buffer strips seeded with wildflower and herb mixtures boost biodiversity, source: Marianne Seip

Benefits

Buffer strips and plots seeded with varieties of wildflowers and herbs provide an important source of forage as well as a refuge for birds and insects as well as small animals and game. Here, cropland that would otherwise be unprofitable in terms of location, cut or size can be repurposed for ecological advantage. Areas with perennial flowering mixtures rich in wild herbs offer insects and many other animal species a year-round habitat together with an abundant food source.

Note: Areas with a higher concentration of overwintering plant species have a higher ecological value than those with annual wildflower varieties.

Location

Farmers will know best which areas can be dedicated to buffer strips and plots, for instance to enhance the ecological value of land that cannot be farmed profitably anyway due to

its location, layout or size. Sites along hedgerows, tree rows or at the edge of a forest are ideal for seeding wildflower strips and plots. South-facing, dry and warm locations are particularly recommended. Headlands, permanently wet and cool or heavily grazed areas, on the other hand, are not suitable. The combination with breeding habitats such as fallow strips or skylark windows further enhances the positive ecological impact of buffer strips seeded with wildflowers and herbs.

Implementation

A finely tilled seedbed is a prerequisite for successful sowing, and problematic root weeds such as couch grass, thistle, white clover or bindweed must be removed beforehand. Using an adjuvant (e.g. soybean meal) at a rate of 100 kg/ha (≈40 lbs/acre), depending on the sowing technique, is recommended. Plant with a seed drill (simply lift the harrow/coulter to create the bare patch), a fertilizer spreader or slug pellet spreader. Since perennial herb mixtures

contain many light germinators, a very shallow application on the soil surface is necessary. Flat rolling is a prerequisite for optimal soil contact. Also, please bear in mind that wild herb seeds need at least three weeks of continuous moisture to swell up and germinate. Regional weather and soil conditions, too, must be taken into account when seeding.

We recommend mixtures that contain at least 20 different flower and herb varieties – you will find plenty to choose from in the overview on page 22. If the pressure from weed growth is high, you might consider seeding in early autumn to give the perennial species in the wildflower and herb mixture a head start. One last thing: Always be sure to use seed mixes with species that are already endemic to your region.

Seeding time

Spring: April to mid-May

Autumn: Mid-August to mid-September

Autumn seeding is preferred for perennials as the plants often grow better and are more competitive.

Maintenance

In the first year, before the seeds of undesirable plant species have a chance to ripen, a cupping cut at a height of approx. 10-15 cm (≈4-6 in) is recommended to prevent the spread of dominant varieties.

From year two onwards, mowing at height of approx. 15 cm (≈6 in) in late winter and again from mid-July onwards is recommended. Be sure to proceed section by section. Note: Removing cuttings gives less competitive herbs a better chance to thrive.



Wildflower plots provide forage, source: BASF



Black-veined white, source: Felix Kubitzki



Flower strips in Quellendorf, source: Sandra Mann

Please keep in mind that this recommendation only serves to underline the advantages of implementing buffer strips and plots. Requirements of official agri-environmental programs may vary. Please consult with regional and local experts who will gladly provide helpful tips and support.



Field margin, source: Erwin Schmidt

Benefits

Field margins serve to protect wild field herbs, many of which are considered endangered – in some cases even extinct – in Germany. Many animal species of the agricultural landscape that require wide open spaces, e.g. field hamsters, partridges, skylarks as well as insect and spider species, benefit from this easy-to-implement measure.

Location

Fields margins are usually recommended in areas where winter cereal crops are cultivated, especially where rare herbs occur, problematic weed species do not dominate, and where pressure from weed growth is relatively weak. Ideal sites are characterized by low crop yields and either very dry or very wet conditions.

Implementing the measure on the south-facing sides of tree rows or hedgerows next to field paths and near fallow land or extensive grassland also helps to connect various habitats with each other.

Implementation

Neither nitrogenous fertilizers nor herbicides may be used on margin strips, which should be at least 3 m (≈10 ft) wide. Mechanical weed control is also prohibited. However, selective control is permitted if individual problem species dominate.

Field margins should be set up for several years, ideally until protected herbs reach seed maturity – before the next crop is tilled. Stubble cultivation is best kept for springtime, so birds, small game and field hamsters can benefit from a wintering and foraging habitat.

Maintenance

If, as recommended, the measure remains in place at the site for several years, a maintenance cut at approx. 20 cm (≈8 in) in the second year will help to prevent the spread of dominant plant species. Be sure to proceed section by section in order to preserve retreat possibilities for small animals as well as to support pollinators. Note: Removing cuttings will make it much easier for less competitive herbs to thrive.

Please keep in mind: the blocking period usually from April until June.



Fallow land, source: Martin Kolbe

Benefits

Fallow land provides refuge and forage for many animal species, making it an attractive habitat. Spontaneous vegetation is usually characterized by high diversity, which attracts various insect species. These, in turn, serve as nutrition for birds and other creatures. The longer soil is fallowed, the richer it becomes in terms of nutrient composition and species diversity. Fallowing is therefore recommended over the course of several years, and at the very least after the harvest until August 1st of the following year. No agricultural production takes place on fallow ground, i.e. there is no seeding or tilling and the use of fertilizers and pesticides is prohibited. In addition, any crop the fallow might yield may not be harvested.

Location

The choice as to which field or fields to fallow is up to the farmer, the idea being to put less favorable cropland or areas known for lower yields to better use. The usefulness of fallow areas can be enhanced by combining them with other foraging habitats, such as wildflower strips and plots, or establishing them alongside hedgerows, tree rows or forest edges, as well as in warm and dry areas facing south.

Implementation

Fallowing requires some preparation in the form of shallow tillage after the end of September. Spontaneous vegetation will occur as a result of the seeds and nutrients present in the soil. Though fallow size can be adapted to operational conditions, strips at least 15 m (≈50 ft) wide are ideal.

Maintenance

Annual cutting to a height of approx. 20 cm (≈8 in) is recommended to prevent dominant plant varieties from spreading. This should be done on a section-by-section basis so the area can keep serving as a refuge but also to support pollinators. Note: Removing cuttings will make it easier for less competitive herbs to thrive.

Please keep in mind: the blocking period usually from April until June.

At the latest by the fourth year, soil cultivation should take place in late summer/fall, as the vegetation on the fallow land will eventually grow over. However, clearings are essential, especially for wild bees (breeding hollows) and birds (foraging).



Lucerne (also known as alfalfa), source: Anna Hottendorff

Benefits

Forage legume crops provide a suitable habitat for ground-nesting bird species familiar to the farming landscape, such as the skylark. They provide an important foraging habitat for raptors, too. As the crop begins to bloom, bumblebees and various other types of bees can regale themselves on the abundant food supply. In case of perennial cultivation, the absence of tillage also means they can nest here undisturbed.

Besides their role in contributing to nitrogen fixation, which is important for soil fertility, many deep-rooting legumes have a positive effect on soil structure as well. They effectively keep the plant population green even under the extreme drought conditions experienced in recent years. Fodder legumes play an important part in ensuring optimum animal nutrition while visually enriching the landscape.

Location

The ideal location is along hedgerows, tree rows and forest edges, preferably in warm and dry locations orientated towards the south. Combining forage legume crops with breeding habitats, such as fallow strips further enhances their ecological value.

Implementation

To ensure strong pre-winter development, seeding should take place as early as possible in August. This way, farmland birds like skylarks will find perfect nesting conditions as they prepare to breed.

Maintenance

The approach to managing and maintaining biodiversity measures goes a long way towards ensuring, even improving their effectiveness. Growing legume crops, for instance, should ideally span several years.

If the biodiversity measure is integrated into a large field, mowing must be carried out in sections, and small sub-areas allowed to bloom in sequence. This way, wild bees and other pollinators will always have a food supply and raptors can use the open spaces to hunt for prey.

If possible, stands should be cut with a bar mower at a height of at least 10 cm (≈4 in) above ground. Please keep in mind that rotary mowers may destroy breeding sites and nests.



Hawthorn blooms in late may, source: Anna Hottendorff

Benefits

Shrubs and hedgerows play a key role in providing food and refuge. They also offer nesting opportunities for many insect and bird species. Planting new shrubs or rows of trees will enhance the impact of existing structures and biodiversity measures, too. The greater the plant variety, the longer the effective flowering period throughout the year. This will in turn ensure an abundant forage supply, especially for pollinators.

Location

Ideally, the new plantings will serve to create a narrow biotope with its own characteristic species combination. Planting shrubs along paths and forest edges as a stepped structure is optimal.

Note: Take care that newly planted shrubs do not overshadow adjacent habitats, especially in later stages of growth.

Ideal sites are dry and warm (south-facing), with little vegetation, e.g. embankments. Open areas, which rare ground-nesting species such as lapwings or skylarks colonize, should also be avoided, as these bird species tend to stay away from shrubs and the like.

Implementation

Be sure to select varieties based on your region and the particular site. These shrubs are generally suitable:

- Hawthorn
- Blackthorn
- Yellow plum
- Field maple

Depending on the available area and desired density, wood species from the list on page 23 may be considered as well.

Maintenance

Please observe the maintenance requirements for your plantings and keep in mind that there may be restrictions as to pruning periods, usually between March and October.



Yellow plum trees bloom in early April
Source: Anna Hottendorff



Hawthorn flowers in late May
Source: Anna Hottendorff

Structural diversity in the landscape



Clearance cairn in Quellendorf, source: Marianne Seip

Mounds, clearance cairns, deadwood piles, soil break-offs

Benefits

Mounds, stone cairns and deadwood piles serve as habitats for numerous species and are valuable 'stepping stone' or transitional biotopes in the agricultural landscape outside actual cropland. They provide almost all reptile species, numerous insects and many other small animals with attractive hunting and hiding places, with micro-climates to dry off in the sun, egg-laying sites and winter quarters. For instance, the wheatear, an endangered ground-dwelling bird species, also breeds in these special structures.

Besides clearance cairns, bare earth mounds and soil break-off edges in sunny, dry/warm locations also provide ideal habitats for wild bees and other insects. Sand martins or bank swallows like to nest in sandy, vertical faces, for example.

Location

In any case, the priority should be on preserving existing landscape features. When installing new structures, look for suitable locations near grassland, fields or fallow land.

Implementation

The first two pictures below show the optimal setup with different sized stones, fine substrates and deadwood. Mounds, clearance cairns and deadwood piles should have a volume of at least 1 m³ (≈35 cu ft). To attract wild bee populations, soil break-off edges should provide a surface area of at least 1 m² (≈10 sq ft) and be at least 30 cm (≈12 in) high. For a cliff, bank or break-off edge to be of interest to birds, the height should be at least two to three meters (≈6.5-10 ft).

Maintenance

Be sure to prevent overgrowth – also in the vicinity of the measure.



Sand martins, also called bank swallows, nest in cliff faces or vertical river banks, source: Mark Schönbrodt



Deadwood pile
Source: Ellen Ritter



Clearance cairn
Source: Marianne Seip



Some wild bee species nest in soil break-offs
Source: Christian Schmid-Egger



Vertical break-off at Trebbin
Source: Mark Schönbrodt



Source: Shutterstock

Benefits

Skylark populations have declined significantly over recent years, and the main cause has been the loss of habitat. Bare, unseeded patches in cereal fields serve as a landing strip for skylarks and provide easy foraging access. Skylarks nest in cereal crops because the cover affords better protection from predators.

Fledgling skylarks in particular benefit from the ample food supply and the shelter – for keeping dry and warm. It is also important to note that skylark plots provide ample forage and safe refuge for other animal species as well, such as partridges, but also small game like brown hare.

Location

Skylark plots are ideally set up in fields with a minimum size of five hectares (≈ 12 acres). Winter cereal crops (except winter barley) are the most suitable. Adjacent measures such as field margins and wildflower strips complement skylark plots by providing additional foraging habitats.

Implementation

The bare patches in the field that form skylark plots are obtained by briefly lifting the seed drill or switching it off. The recommendation is two lark windows of 20 m^2 ($\approx 215\text{ sq ft}$) per hectare (≈ 2.5 acres). Once the plots are created, the field can be treated normally throughout the year.



Eurasian skylark (*Alauda arvensis*)
Source: Shutterstock



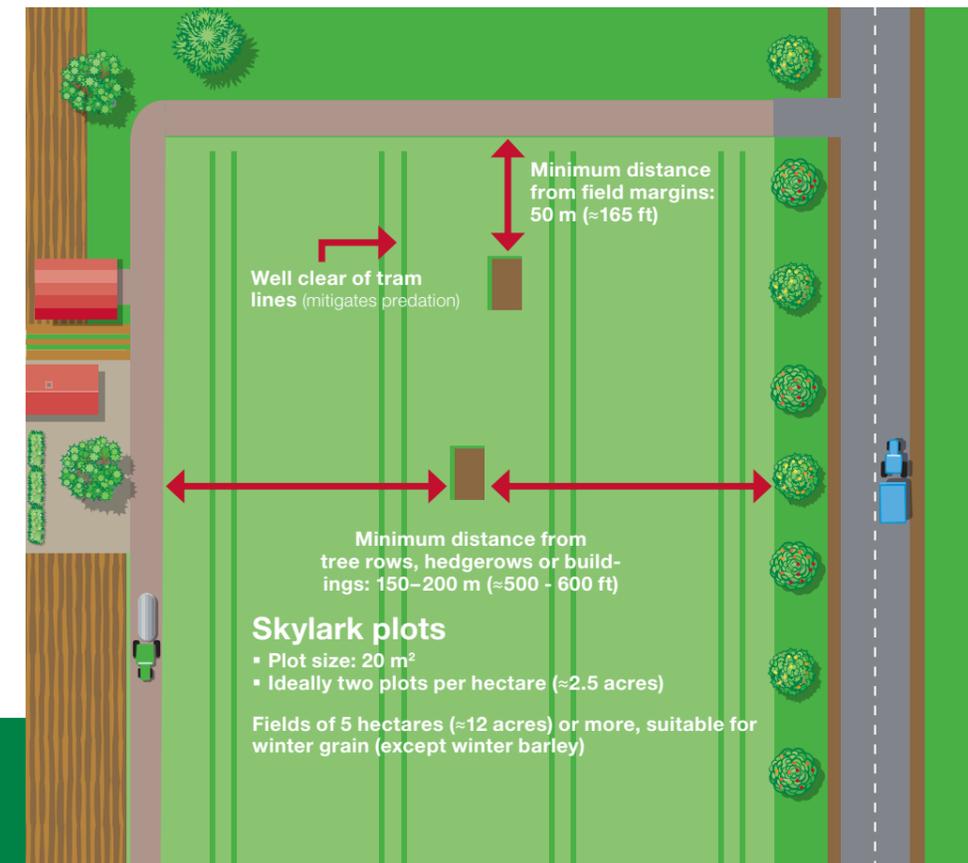
Feeding the chicks
Source: Shutterstock



Skylark plot in winter wheat
Source: Bernd Hartmann



A skylark's view of landing and foraging zones
Source: Bernd Hartmann



What to keep in mind when implementing skylark plots

Nesting aids for birds and bats



Nest box, source: Marianne Seip

Benefits

Many of our bird species, including various extremely useful insectivores, are now generally suffering from the widespread lack of natural nesting cavities and other breeding spaces. Nesting aids now play a key role in facilitating reproduction.

Location

Artificial nesting aids are useful where old and decaying trees are no longer present (and therefore taking advantage of natural cavities is no longer possible), but also where buildings do not provide suitable nesting niches.

Implementation

Different nest box types and sizes apply to different bird species.

Farm buildings and surroundings offer plenty of possibilities for installing nest boxes – which birds readily call home.

Please observe the site recommendations for the various nest box types.

Good rules of thumb:

- Place nest boxes between 1.5 and 5 meters above ground (≈5-16.5 ft)
- Sites should be sheltered, in the shade or partially in the shade, and safe from predators
- The best time of year to install nest boxes is in the autumn and no later than early spring

Maintenance

Nest boxes should be cleaned once a year starting from the end of August. Cleaning the boxes removes parasites and ensures optimal conditions for successful breeding the following year.



Nesting aids should be cleaned once a year.
Source: Matthias Gerber

Tip: Do good and let people know! Place small signs on visible nest boxes so walkers can see that you're doing your bit to conserve wildlife.

There may be a workshop for people with disabilities nearby that could produce nest boxes to suit the various species at your farm.



Kestrel nest box
Source: Matthias Gerber



Nesting aids for swallows in a barn
Source: Matthias Gerber



Nest boxes on the 'Owl Tower' in Reuden
Source: Matthias Gerber



Getting creative with nesting aids
Source: Matthias Gerber



Brown owl nest box
Source: Marianne Seip



Lapwing, source: Shutterstock

Lapwing measures only make sense if the species is present in your region.

Benefits

Lapwing numbers have also declined sharply in recent years. The measures described in this section will effectively support existing populations by providing these birds with an optimal living space. Safe breeding and foraging habitats are key to promoting population growth.

The habitat of the lapwing is characterized by low vegetation in wide open landscapes. Sites for lapwing plots are ideally situated in fallow land or grassland with grazing livestock in the vicinity of wetlands. That is because lapwings are waders and these areas provide an abundance of their favorite food, e.g. earthworms.

Option 1

Clear a fallow plot between 0.5 and 1.5 hectares (≈1.2-3.7 acres) in the middle of a field, ideally in a very humid location or wet grassland. Using machines on these areas should be avoided from mid-March to mid-July.

Option 2

Mark the locations of lapwing nests in fields and meadows and steer well clear of them during cultivation (about 3 m (≈10 ft)). Establishing wildflower strips or fallow plots in the immediate vicinity is also recommended to provide chicks with ample foraging and refuge opportunities.

Although refraining from cultivation during the breeding period (late March to late May) would be ideal, this is understandably quite difficult to implement in practice.

Option 3

Another option is to create the kind of wet habitat lapwings thrive in by closing off individual drainages or damming up ditches. Where possible, use wet depressions already present in the field. Refraining from seeding these areas, which are already characterized by low yields to begin with, can have a positive effect on the lapwing population.



Grey partridges, source: Shutterstock

Creating safe areas for partridges only makes a difference if they are indigenous.

Benefits

Partridges are quite demanding when it comes to their habitat, and they require diverse structures – from which many other birds, insects and small mammals can also benefit.

Partridges breed in wildflower strips, on fallow land or in grassland. The greatest threat is posed by predators such as foxes and cats, but also raptors.

Partridge protection measures are especially effective during the breeding season (May-July) and provide shelter the rest of the year.

Breeding pairs seek cover as early as March, preferably in the herbaceous vegetation of perennial wildflower plots. Chicks are cold-blooded and must feed on insects early on to warm up. Annual vegetation, still free and unmat- ted from below but offering protection from above, is optimal. Structurally diverse wildflower strips provide the best of both worlds.

Location

Partridge conservation areas should be set up in quiet locations, well clear of frequented paths. They should be dry and not too close to forest edges and trees to mitigate predation. Having hedgerows in the vicinity is particularly beneficial in areas where there is a lot of snow in winter: this will provide effective shelter. Ideal shrub varieties, for instance, are blackthorn or blackberry.

For best results, the shrubs should be planted a few meters apart and surrounded by herbaceous vegetation.

Implementation

On perennial flowering areas, it is recommended to proceed in sections and reseed (or cultivate using the soil seed bank) on an annual basis. Wildflower strips should be at least 20 m (≈65 ft) wide to mitigate predation. The flower/ herb mixture should not contain too many dominant species and no varieties that grow too close to the ground.

Maintenance

Mowing should be done from mid-August in order to protect the chicks of the second brood.



Wild bee and large white (or cabbage butterfly) meeting on a cornflower, source: Marianne Seip



Field margin, source: Erwin Schmidt

Ecologically sensible and valuable biodiversity measures are often not actively promoted. Most often due to lack of funding.

BASF now offers farmers in Germany two scenarios for financing any of the 10 biodiversity measures presented here – and getting the balance right between productive farming and nurturing biodiversity.

Scenario 1 looks at financing biodiversity measures along the value chain. Here, the end consumer ultimately pays a 'biodiversity premium' for sustainable, environmentally responsible food production. This marginal extra cost is spread out over the value chain, with farmers receiving the largest share to implement further biodiversity measures.

Scenario 2 works with the BASF FarmersClub, the company's loyalty program, to promote the implementation of biodiversity measures.

Farmers collect points which can then be converted into various prizes and benefits. BASF will double every point redeemed towards implementing a biodiversity measure.

With these two approaches, BASF provides two different and complementary approaches for implementing biodiversity measures on farms – in a way that reconciles economic realities with environmental priorities.

- Nature and Biodiversity Conservation Union (2018): Praxishandbuch Kiebitz schützen (*Protecting the Lapwing: A Practical Guide – in German only*)
- Cimiotti, D. Hötter, H. & Schöne, F. (2011): Projekt "1000 Äcker für die Feldlerche". Naturschutzbund Deutschland e.V. in Kooperation mit dem Deutschen Bauernverband (*Project "1000 Fields for the Skylark". Nature and Biodiversity Conservation Union, Germany, in cooperation with the German Farmers Association – in German only*)
- Becker, N. Muchow, T. & Schmelzer, M. (2019): AgrarNatur-Ratgeber – Arten erkennen – Maßnahmen umsetzen – Vielfalt bewahren (Hrsg. Stiftung Rheinische Kulturlandschaft), Bonn 220 S. (*AgrarNatur Guide – Identifying species – Implementing measures – Maintaining diversity (Publisher: Rheinische Kulturlandschaft Foundation), Bonn 220 S. – in German only*)
- Chamber of Agriculture North Rhine-Westphalia: Ökologische Bedeutung von Biodiversitätsmaßnahmen, Bracheflächen (*Ecological importance of biodiversity measures, fallow lands – in German only*).
- Chamber of Agriculture North Rhine-Westphalia: Maßnahmenblatt Gelegschutz Kiebitz (*Measures for protecting lapwing clutches - in German only*)
- E. Gottschalk, W. Beeke: Rebhuhnschutz vor Ihrer Haustür, Erfahrungen und Erkenntnisse aus dem Göttinger Rebhuhnschutzprojekt und aus dem Interreg North-Sea-Region-Project PARTRIDGE (*Partridge conservation at your doorstep, Experiences and Insights from the Göttingen Partridge Protection Project and the Interreg North-Sea-Region-Project PARTRIDGE – in German only*)
- German Wildlife Foundation

Wildflowers for promoting bee populations

Source: German Wildlife Foundation

Family	Scientific species name	English species name	Flowering period					
			MAY	JUN	JUL	AUG	SEP	OCT
Asters	<i>Achillea millefolium</i>	Common yarrow						
Asters	<i>Carduus nutans</i>	Nodding thistle						
Asters	<i>Centaurea jacea</i>	Brown knapweed						
Asters	<i>Centaurea scabiosa</i>	Greater knapweed						
Asters	<i>Centaurea stoebe</i>	Spotted knapweed						
Asters	<i>Cichorium intybus</i>	Common chicory						
Asters	<i>Crepis biennis</i>	Rough hawksbeard						
Asters	<i>Crepis capillaris</i>	Smooth hawksbeard						
Asters	<i>Helichrysum arenarium</i>	Dwarf everlast						
Asters	<i>Heracleum sphondylium</i>	Hogweed, cow parsnip						
Asters	<i>Hypochaeris radicata</i>	Catsear, flatweed						
Asters	<i>Leontodon autumnalis</i>	Autumn hawkbit						
Asters	<i>Leontodon hispidus</i>	Bristly hawkbit						
Asters	<i>Leucanthemum ircutianum</i>	Ox-eye daisy, marguerite						
Asters	<i>Tragopogon pratensis</i>	Meadow goat's-beard						
Bellflowers	<i>Campanula patula</i>	Spreading bellflower						
Bellflowers	<i>Campanula rotundifolia</i>	Harebell, Scottish bluebell						
Bellflowers	<i>Jasione montana</i>	Sheep's bit, blue bonnet						
Borages, forget-me-nots	<i>Anchusa officinalis</i>	Common bugloss, alkanet						
Borages, forget-me-nots	<i>Echium vulgare</i>	Viper's bugloss, blueweed						
Honeysuckles	<i>Knautia arvensis</i>	Field scabious						
Legumes	<i>Lathyrus pratensis</i>	Meadow pea						
Legumes	<i>Lotus corniculatus</i>	Common bird's foot						
Legumes	<i>Medicago lupulina</i>	Hop clover, black medich						
Legumes	<i>Ononis repens</i>	Common restharrow						
Legumes	<i>Securigera varia</i>	Purple crownvetch						
Legumes	<i>Trifolium arvense</i>	Hare's foot clover						
Legumes	<i>Trifolium campestre</i>	Field clover						
Legumes	<i>Trifolium pratense</i>	Red clover						
Mallows	<i>Malva alcea</i>	Vervain mallow						
Mints, deadnettlles	<i>Prunella vulgaris</i>	Common self-heal						
Mints, deadnettlles	<i>Salvia pratensis</i>	Meadow sage						
St. John's worts	<i>Hypericum perforatum</i>	Perforate St John's wort						
Stonecrops	<i>Sedum acre</i>	Scharfer Mauerpfeffer						
Stonecrops	<i>Sedum sexangulare</i>	Tasteless stonecrop						
Umbellifers	<i>Anthriscus sylvestris</i>	Wild chervil						
Umbellifers	<i>Daucus carota</i>	Wild carrot						
Fast-blooming species								
Asters	<i>Centaurea cyanus</i>	Cornflower						
Borages, forget-me-nots	<i>Lithospermum arvense</i>	Field gromwell						
Legumes	<i>Trifolium incarnatum</i>	Crimson clover, Italian clover						
Poppies	<i>Papaver rhoeas</i>	Common poppy						
Umbellifers	<i>Anethum graveolens</i>	Dill						
Umbellifers	<i>Coriandrum sativum</i>	Coriander						
Umbellifers	<i>Foeniculum vulgare</i>	Fennel						

Trees and shrubs for promoting bee populations

Source: German Wildlife Foundation

Families/ Tribes/Genera	Examples of species	Flowering period (varies according to species)						
		MAR	APR	MAY	JUN	JUL	AUG	SEP
Willows (<i>Salix</i>)	Goat willow (<i>Salix caprea</i>) Basket willow (<i>Salix viminalis</i>) Gray willow (<i>Salix cinerea</i>)							
Maple (<i>Acer</i>)	Field maple (<i>Acer campestre</i>)							
Oak (<i>Quercus</i>)	European oak (<i>Quercus robur</i>)							
Elder (<i>Sambucus</i>)	Elderberry (<i>Sambucus nigra</i>)							
Currants, gooseberries (<i>Ribes</i>)	Redcurrant (<i>Ribes rubrum</i>) Blackcurrant (<i>Ribes nigrum</i>) Gooseberry (<i>Ribes uva-crispa</i>) Redflower currant (<i>Ribes sanguineum</i>)							
Buckeye (<i>Aesculus</i>)	European horse chestnut (<i>Aesculus hippo-castanum</i>)							
Stone fruit (<i>Amygdaleae</i>)	Peach (<i>Prunus persica</i>) European plum (<i>Prunus domestica</i>) Blackthorn (<i>Prunus spinosa</i>) Sour cherry (<i>Prunus cerasus</i>) Cherry plum (<i>Prunus cerasifera</i>)							
Barberry (<i>Berberis</i>)	Common barberry (<i>Berberis vulgaris</i>)							
Pome fruit (<i>Malinae</i>)	Apple (<i>Pyrus malus</i>) Rockspray cotoneaster (<i>Cotoneaster horizontalis</i>) Quince (<i>Cydonia oblonga</i>) Snowy mespilus (<i>Amelanchier ovalis</i>) Midland hawthorn (<i>Crataegus laevigata</i>)							
Wisteria (<i>Wisteria</i>)	Chinese wisteria (<i>Wisteria sinensis</i>)							
Dogwood (<i>Cornus</i>)	Cornelian cherry, European cornel (<i>Cornus mas</i>) Bloody dogwood (<i>Cornus sanguinea</i>)							
Blueberry (<i>Vaccinium</i>)	European blueberry (<i>Vaccinium myrtillus</i>)							
Rowan (<i>Sorbus</i>)	Rowan, mountain ash (<i>Sorbus aucuparia</i>)							
Guelder rose (<i>Viburnum</i>)	Guelder rose (<i>Viburnum opulus</i>)							
Honeysuckle (<i>Caprifoliaceae</i>)	Common snowberry (<i>Symphoricarpos albus</i>) Italian honeysuckle (<i>Lonicera caprifolium</i>)							
Raspberry, blackberry, dewberry (<i>Rubus</i>)	Blackberry (<i>Rubus fruticosus</i>) Himbeere (<i>Rubus idaeus</i>)							
Spindle (<i>Euonymus</i>)	Common spindle (<i>Euonymus europaeus</i>)							
Wild rose (<i>Rosa</i> spp.)	Dog rose (<i>Rosa canina</i>) Gallic rose, French rose (<i>Rosa gallica</i>) Burnet rose (<i>Rosa spinosissima</i>) Cinnamon rose (<i>Rosa majalis</i>)							
Linden/lime (<i>Tilia</i>)	Silver linden/lime (<i>Tilia tomentosa</i>) Large-leaved linden/lime (<i>Tilia platyphyllos</i>) Small-leaved linden/lime (<i>Tilia cordata</i>)							
Summer lilac (<i>Buddleja</i>)	Summer lilac, butterfly bush (<i>Buddleja davidii</i>)							
Ivy (<i>Hedera</i>)	Common ivy (<i>Hedera helix</i>)							

