

Practice in rural / agricultural areas anti-reducing pollinator populations

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Bees calling for help – campaign for protection habitats of bees and other pollinators, financed by the EEA Financial Mechanism and Norwegian Financial Mechanism 2009–2014.



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Lesson objectives

- Identify the main reasons for the decline of pollinators.
- Presentation of ways to stop them.
- Examples of good practice conducive to the improvement of habitat for pollinators.

Introduction

The currently observed large decline in pollinator populations (not just honeybees) is caused by a number of factors which individually or collectively affect the generally poor condition of this important ecological groups of animals. The presence of pollinators is not only important for plants pollinated by them but also to us – using benefits of hard work of many species of pollinators. An important role in shaping friendly space for pollinators play rural areas. Open areas such as flowery meadows, margins and woodlots, orchards and gardens and even backyard gardens or ponds waterfront are a place of rest, development and food for many pollinators. But also in these areas due to agricultural intensification lurks many dangers. Aware of these threats combined with the knowledge and good will of people can change the current state of affairs and improve habitat conditions of these necessary and useful invertebrates.

The main reasons for the decline in pollinator populations in rural areas

The main causes of the decline of pollinators in rural areas is without doubt a wide process of intensification of agriculture. It depends not only on the use of more efficient methods of farming or animal husbandry methods but also in introducing greater than the unprecedented scale of plant protection products (pesticides, herbicides) and fertilizers. This concept is also a series of processes related to the homogenization of agricultural space (land consolidation, establishment of large plant monocultures, photo 2) and change of use of these areas (conversion of permanent grassland into farmlands or under buildings). The above-mentioned factors on the one hand significantly reduce the food source for pollinators, on the other living space (habitat destruction). In addition, the applied agricultural practices such as chemical spraying, deep plowing (photo 3) or hauling have a negative impact on pollinating insects. Especially dangerous are plant protection products (pesticides), especially when used improper way and contrary to the principles set out in the instructions or on product labels. Chemicals have a strong biocidal effect. On the one hand the herbicides impoverish the diversity of melliferous plants eliminating from it weeds (reducing food base), on the other toxic pesticides (insecticides) lead to the death of a number of insects - not only so-called pests but also useful from the human point of view. Another problem is burning of grass (photo 4), now happily becoming less common. The practice of burning is dangerous for insects (for all their forms of development: eggs, larvae, pupae, adult forms) staying in the surface layers of soil or shallow underground during wintering. High temperature and toxic smoke kill these forms of life thereby disrupting the continuity of generation of individual species in the fired area. Not without impact on pollinators has also change the look around. Country backyard landscape less and less like the colorful spaces filled with a multitude of colors and mixture of smells of flowers. Currently we practice the principle of having a green short cut lawn (photo 5) in addition planted with shrubs of coniferous trees (thuja).



Fot. 1 Łąka pełna kwiatów
(J. Józefczuk)



Photo 2 Large monocultural cultivation
(J. Józefczuk)



Photo 3 Tillage based on [https://pl.wikipedia.org/wiki/Orka_\(rolnictwo\)](https://pl.wikipedia.org/wiki/Orka_(rolnictwo))



Photo 4 Destruction of pollinator habitats – meadows burning (J. Józefczuk)

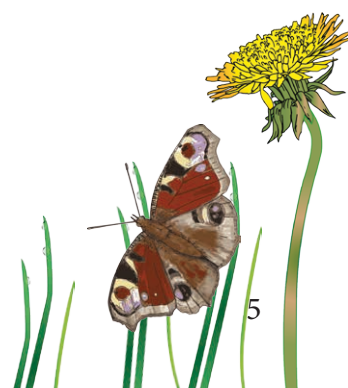




Photo 5 Lawn – based on <https://pixabay.com/pl>

Ways of reducing pollinator populations. Examples of good practice

Ways to counteract the decrease in the population of pollinators can be divided into three groups.

The first focuses efforts to restore, enrichment or to maintain an optimal food base (providing so-called food tape). The second group refers to the activity associated with the creation, restoration and protection of habitats. The third relates to the proper realization of agricultural treatments (especially chemical spraying).

Maintenance and enrichment of the food base

As part of activities related to improving food base are planted in gardens and around houses and even on balconies and rooftops, plants producing nectar that bloom at different times from spring (photo 6) to autumn (photo 7) so that pollinators have food available throughout their period of seasonal activity (food tape).

Therefore, we should choose early-, mid- and late-blooming varieties of plants, thereby extending the overall feeding period for pollinators, which in early spring and late autumn often lack food sources. Resignation of the establishment of backyard rockery, planting of conifers or from maintaining „golf course” style lawns for the introduction of native species of trees and shrubs or herbaceous plants (annuals, several years or many years perennials) will provide suitably varied in time and space food base for pollinators.



Photo 6 The first spring flowers – crocuses (E. Szczęśniak)

Examples of species of trees and shrubs that provide food to pollinators:

- Native species: willow - mainly goat willow, white willow, maple, field maple, linden trees, hawthorns, honeysuckles, brooms (Cytisus), wild roses, raspberries, blackberries, field pears.



Photo 7 Blooming, autumn varieties of asters (E. Szczęśniak)

Examples of species of herbaceous plants (annuals, several years or many years perennials) that provide food pollinators:

- aconite, comfrey (photo 8), avens (Geum), creeping jenny (Lysimachia Nummularia), coneflowers and black-eyed-susans (Rudbeckia), purple coneflower, foxglove, deadnettles, bugloss, willowherbs, sage, blue bonnets, hedgenettle, lungwort, blue bugle, Echium, yellow toadflax (photo 9), Dahlia, sunflower, elephant's ears, globe thistles, hollyhocks, snapdragon, marigold, Crocus, lionshearts, lavender, catnip.



Photo 8 Comfrey (Z. Dajdok)

Examples of herbs that provide food pollinators:

- Oregano, salvia (photo 9), thyme, hyssop.

In particular, it is also important to maintain ecotones (unploughed strips of land between two fields, the edges of forest, meadows on field, bushes, roadsides, the so-called fallow lands) allowing pollinators find other species of plants than those growing in cultivated fields. This is more important that the field provides benefit (food) only during the flowering period of grown plant in a given year. End of flowering is tantamount to a lack of food. For this reason, such an important role have transitional habitats of a nature ecotones.

Similarly, any action leading to the prevention of succession (overgrowing trees and shrubs) in open spaces such as the cessation of grazing or mowing meadows will allow pollinators to find in mosaic landscape different species of nectariferous plants, what is important for their survival.



Photo 9 Yellow toadflax with bumblebee *Bombus* spp. (Z. Dajdok)



One of the elements which helps maintain the diversity of pollinators food is also a fight against alien plant species with invasive character. The patches of land overgrown in goldenrod will soon become the same „utility desert” which is concreted urban space and green lawns type of golf course.

Creation, restoration and protection of habitats

At the farm level we can maintain a favorable habitat for pollinators by excluding from cultivation 5-7% of the area under what is known ecological lands. Such diversity in the agricultural landscape will bring up a variety of micro-niches fitted to create nest or shelter, including overwintering.

Just as leaving uncut lawns (at least parts of them), setting flowery gardens, resignation of the rockery garden and a lawn-style „golf course” as well as leaving the sunny and sandy slopes that create a place suitable for settlement and growing.

Establishment of artificial places for procreation

To prevent depletion of natural microhabitats suitable for repopulation by pollinators, we can simply create them yourself. These activities don't require complex technology or some large financial investment. One such way is laying on agricultural areas stone heaps which can be used for nesting, for example by some species of bumblebees. However, in the backyard we can install a replacement homes (substitute houses), so-called hotels for insects. Depending on the design, they will serve both bumblebees as well as a solitary species of bees. It should be remembered that in the vicinity of such mini-buildings within the flight of insects were available both a food source (such as melliferous plants) and clean water. Homes for bumblebees (cube with minimum dimensions of 13x13x13 cm) should be made of raw wood, have an inlet hole size from 15-10 mm in diameter and tight peak, so that moisture don't get up into the nest. Very important it is also the isolation of the floor, so it is good to install a house on the tree or on some increase, preferably in place of moderately sunny. For the solitary bee species we can build houses of wood by drilling into wooden blocks (9x15x30 cm) holes of different diameters (2-7 mm) and lengths (6-12 mm) also from different angles. It is important that the wood was painted with toxic substances (glues, paints, impregnates). In addition, we can build houses with cane stalks cut to a length of about 10-20 cm (photo 10), elderberry twigs or woody bamboo shoots. The diameter of stalks should be varied, so selection of pollinators will be more attractive, and one of the ends (of the stalks) should be closed. So cut pieces can be put into plastic bottles, cans or carton from juice or can be tie and hang out in a moderately sunny spot or put on the windowsill, under the eaves, on the veranda. They will become home to orchards pollinators - red mason bees. For the more habitat demanding species we can build a special clay-straw structures (Photo 11). Their preparation requires the mixing ratio of 3: 1 of the wet clay and finely shredded straw which then we form a block and in one of the walls drill holes. After drying in the sun we set it in the garden or in the orchard among the trees or in a quiet and sunny spot near the house from south or south-east side. Also, we can put in the gardens upside-down flower pots filled with dry grass and moss and hollow bricks (it's important that one of the walls adhere tightly to the other vertical surface, for example to the wall of a building). People more involved and having a bit more space for development might attempt to build a multi-storey construction of wooden pallets. Their advantage is the ability to combine different construction of cottages in one place (drilled wooden blocks together with clay structures).



Photo 10 Oregano (J. Józefczuk)



Photo 11 Sage *Salvia* spp.
(E. Szczęśniak)



Photo 12 House for pollinators made of cane (Ł. Porebski)





Agritechnical treatments

One of the most important ways to counteract the decline in the number of pollinators is intelligent and balanced use of plant protection products, especially in the growing season. Therefore, in accordance with the recommendations of the Chief Inspector of Plant Health and Seed farmers, growers and gardeners involved in the process of agricultural production should pay particular attention to the correctness of the treatments, in particular:

- use only plant protection products authorized for marketing and use on the basis of licenses issued by the Minister of Agriculture and Rural Development or parallel trade permits;
- use plant protection products in accordance with the terms of the label (manual);
- matching plant protection products in such a way as to minimize the impact of chemical treatments on non-target organisms;
- avoiding the use of toxic preparations for bees during flowering period of the crops and crops for which there are flowering plants (so-called weeds);
- making treatments after ended flights of pollinators (only in the evening and when identified termination of their flights);
- maintaining a minimum distance from apiaries (at least 20 m);
- compliance periods of prevention;
- making treatments only in appropriate weather conditions, ensure that the liquid used during the treatment does not move (wind weaker than 4 m/s) (<http://www.piorin.gov.pl>). In addition, it's worth to protect beehives during making treatment, if there is a risk of contact with the working liquid.

Always there, wherever possible, we should use natural plant protection products. In crops, as mid-yield or source of fertilizer, it's worth to sow phacelia, buckwheat, mustard, as well as clover.





Photo 11 Przygotowanie glinano-słomianego domku dla zapylaczy (Ł. Porębski)



Photo 12 House for pollinators (J. Józefczuk)



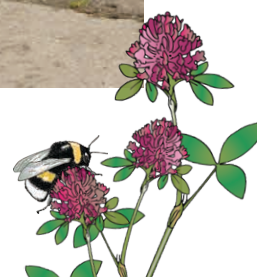
Photo 13 Different kind oh house for pollinators (J. Józefczuk)



Conclusion

Reducing negative factors in agricultural activities affecting the populations of pollinators as well as taking care of our home surroundings and engagement in simple activities conducive to the maintenance of the habitats can significantly reduce the contraction in the population in the environment. Examples of our own efforts can encourage others (eg. neighbors) for the same activity, involving f.e. the establishment of small hotels for insects or maintaining / playback of places to find food by these insects.

Photo 11 Creating flower zone for bees
(J. Józefczuk)



Exercise

1. **When should be performed chemical spraying on the fields?**
 - a) in the morning
 - b) at midday
 - c) in the evening after the termination of insects flights
 - d) early afternoon
2. **At what wind speed we cannot perform treatments of chemical spraying?**
 - a) when the wind speed is more than 4 m/sec
 - b) when the wind speed is more than 5 m/sec
 - c) when the wind speed is between 2-3 m/sec
 - d) when the wind speed is more than 6 m/sec
3. **Which species of bees willingly inhabits house made of cane stalks?**
 - a) large earth bumblebee
 - b) violet carpenter bee
 - c) honeybee
 - d) red mason bee (*Osmia rufa*)
4. **Question 4. Do we need to strive for removal of goldenrod from agricultural landscape, although it produces nectar?**
 - a) yes,
 - b) no.
5. **„Utility desert” is a term used to describe:**
 - a) a place devoid of nectariferous plants
 - b) a place useless to settlement
 - c) an unattractive place for development
 - d) none of the above

Answers:
1. b
2. a
3. d
4. a
5. a

