BESNet
Biodiversity and Ecosystem Services Network

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BES-Net Trialogue on Pollinators, Food Security and Rural Development

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BES-Net is hosted by the United Nations Development Programme (UNDP) and implemented through partnerships with the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Norwegian Environment Agency and SwedBio at the Stockholm Resilience Centre.

Status and trends of the pollinators' population in the country

Agriculture is one of the core sectors of the economy of the Rep.of Moldova contributing to the gross domestic product by about *12%, whereas to the food industry* the contribution amounts to 40% of the total industry. The volume and the quality of the agricultural products depend directly on the pollinators' status.

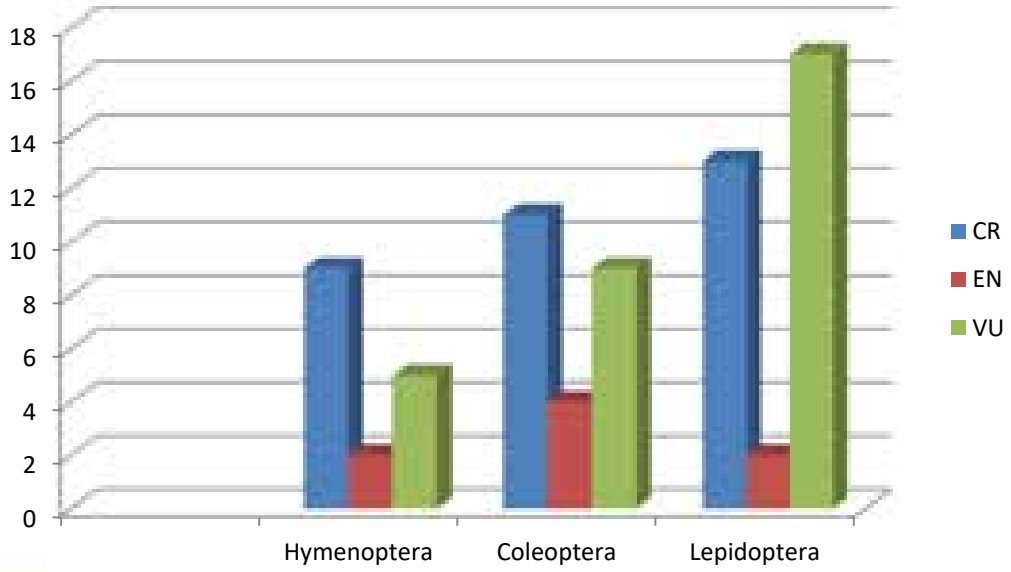
The most widely spread species of pollinators in the Rep.of Moldova are from ***Hymenoptera Ord.***– more 100 SPP., that the ants, bees, bumble bees, wasps belong to, are phytophage which feed on flower nectar and fruit juice and are social species. ***Coleoptera*** are widely spread in different terrestrial and aquatic habitats. ***Diptera*** are cosmopolitan species of different forms: pollinating, parasitic, predatory, saprophagous, hemophage that easily adapt to different life conditions.

Order	Families	Species
Diptera	Sarcophagidae	Sarcophaga carnaria
	Califoridae	Lucilia caesar
	Syrphidae	Syrphus ribesii
		Eristalis tenax
		Spherophoria scripta
	Tachinidae	Tachina fera
Hymenoptera	Apidae	Apis mellifera Spp.
	Andrenidae	Andrena bucephala and over 48 SPP.
	Scoliidae	Scolia hirta
	Formicidae	Formica rufa
		Lasius niger
	Helicidae	45 Spp.
	Vespidae	Katamenes arbustorum
Coleoptera	Coccinelidae	Coccinella septempunctata
		Adalia bipunctata
		Adalia quadrimaculata
		Harmonia axyridis
	Cantharidae	Rhagonycha fulva
	Scarabeidae	Cetonia aurata

Status and trends of the pollinators' population in the country

In the Republic of Moldova, there is a large number of *invertebrate species:* **Critically Endangered (CR), Endangered (EN) and Vulnerable (VU),** which have been included into the 3rd Edition of the Red Book of the Republic of Moldova and are important for plants' pollination (Annex 2, fig.2). The largest ones come from the ***Apidae fam.*** (13 Spp.) - ***Ord. Hymenoptera; fam. Carabidae*** (8 Spp.) ***and fam. Cerambycidae*** (6 Spp.) – ***Ord. Coleoptera and fam. Nymphalidae*** **(8 Spp.)** –***Ord. Lepidoptera***.

In the diagram it is well-demonstrated that the largest number of CR species of invertebrates is of *Ord. Lepidoptera.*



Main crops that area pollination - dependent in the country

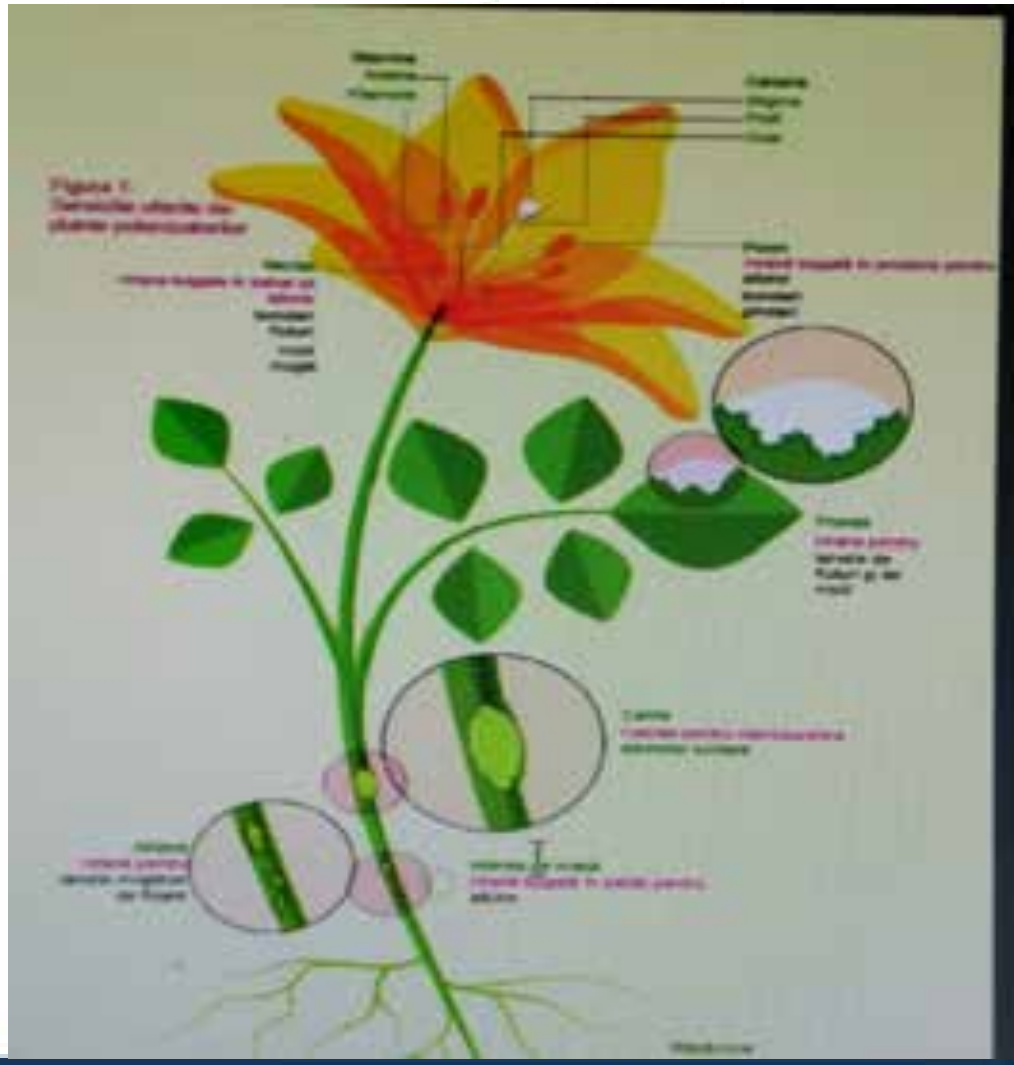
Firstly, the melliferous insects contribute largely to the agricultural production pollinizing over **150 species of cultivated plants**. The orchards' pollination by bees alone**, increases the production by 20-50%.**

The following are the main pollination-dependent crops:
- all the SPP***. from the fam. Rosaceae*** (apple, plum, apricot, pear, cherry, sour-cherry, peach, almonds trees) etc.
- ***some vegetables***: water melon, cucumber, zucchini, melon, pumpkin etc.
-***berries***: raspberry, strawberry, currants, gooseberries etc.
-***other agricultural crops***: rapeseeds, sunflower, buckwheat, fodder plants, species of spices and others.

Main crops that area pollination -dependent in the country

A pollinating plant may provide different *Services* (Fig. 3), as:

Pollen: protein-rich feed for bees, bumble bees, beetles;
Nectar: sugar-rich feed for *bees, bumble bees, butterflies, moths, flies*;
Leaves: feed for *butterfly, moth* larvae;
Cavities: breeding habitat for *solitary bees*:
Blueberries: feed for flower flies' larvae:
Honeydew: sugar-rich feed for *bees.*



Factors that are causing threats to the quantity, health and diversity of managed and wild pollinators

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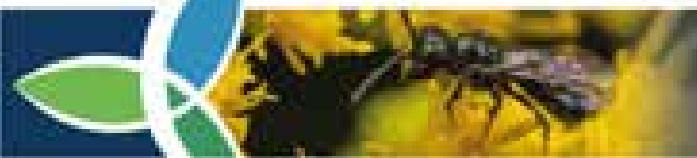
i) Land use change

1) The process of agricultural ecosystem change, as well as the abandonment of lands :

- massive grubbing-up of the old orchards and vineyards and changing those with other more economically advantageous crops,
- changing the destination of agricultural land, by building economic buildings, installation of antennas, transmitters and other constructions,
-illegal grubbing-up of forests in the rural localities, for fuel wood, without taking into account the trees that represent nesting sites for invertebrates.

2) *The small forest area* - 11% *and protected natural areas* - 5.6%, which is a shelter for several species of pollinators.

3)Lack of adjacent land with natural or semi-natural habitats, near agricultural land,(forests, protection strips, meadows, steppes, etc.).



Factors that are causing threats to the quantity, health and diversity of managed and wild pollinators

ii) Intensive agricultural management

1) Inadequate land management practices, that are not favorable for the pollination process. Flower-rich meadows have been replaced by large cereal crops or pastures that provide low resources for pollinators.

2)The steppes have almost disappeared, and the existing ones are fully managed for grazing and mowing.

3) Another problem is lack of rotation in using the land from one agricultural crop to another - the rotation of the crops provides a seasonal diversity of pollen sources and may reduce the requirements for fertilizers.

iii)Genetically Modified (GM) crops

In the Rep. of Moldova the GMOs is not merely a problem for the pollinators. There is a Law on GMOs, which doesn't allow introducing GMO into the nature.

Factors that are causing threats to the quantity, health and diversity of managed and wild pollinators

iV) Pesticides

1)The use of pesticides and fertilizers which are harmful to pollinators, seed treatment with insecticides has become a major problem since the second half of the last century when the country used to be part of the USSR, with an intensive agriculture policy.

2) Another problem is that often the dosage, the application calendar (including the time of the day and weather conditions) and the application technology of chemicals are not taken into account.

3)The landowners are insufficiently informed about the properties and the damage the chemicals could cause.

v) Pathogens and pests

Starea de sănătate a polenizatorilor – este o problemă în țară. Cel mai adeseori albinele sunt afectate de *VARROA, virozele* "virusului aripilor deformate", "virusului acut al paraliziei albinelor" etc. Însă un monitoring și statistică oficială nu există în acest sens.

Factors that are causing threats to the quantity, health and diversity of managed and wild pollinators

vi) Climate change

Under the current soil-climate conditions of the Republic of Moldova, 512 species of endangered plants (27.4% of the total plant number) are in the risk zone. From among plant SPP., dependent on climate conditions are the plants in the ecosystems of the forestry zone (126 species), steppe (151 species) and rocks (68 species). The animal world is influenced by the degradation of plant associations, shortage of feed, water and places of reproduction, caused by climate changes. The most of the natural ecosystems are fragmented and degraded.

One can note an intensified process of eutrophication, in the steppe and grassland ecosystems – the process of spreading of xerophytes and substitution with ruderal plants.

Factors that are causing threats to the quantity, health and diversity of managed and wild pollinators

vii) Invasive alien species

1)Invasive alien species are a severe threat for the natural biologic resources, which also have a significant economic impact. There are about 150 species of invasive animals that live on the territory of the country, of which about 130 species which damage agricultural crops, while 15 species damage forests. It was found that the yearly agricultural losses represent 5-10% of grain crops, 15% are weeding plants and 25% are perennial crops.

2)Is a problem related to the replacement of some domestic melliferous species from wild flora by invasive species (poplar, American maple, etc.).

3)Risk of competition occurring, under certain conditions, between honey bees and other pollinating species, such as solitary bees or butterflies, for example when several organisms need a limited feed resource. Some pollinators actively parasite other pollinating species, the so-called cuckoo bees do not make their own nests but invade the nests of other species of solitary bees.

Factors that are causing threats to the quantity, health and diversity of managed and wild pollinators

VIII. ***Other risk issues related to pollinators (the impact on biodiversity, lack of policy documents etc.)***

1) *Lack of attention drawn to the status of other melliferous insects* than the bees and the bumble bees and not taking measures to protect their habitats. Thus, many species (of order Coleoptera, Lepidoptera, Hymenoptera) are underestimated and are on the verge of extinction.

2) Lack of policy documents, or the non-compliance with the ones in place, on promoting the extension of the protection strips by planting mellieferous species, with lands with perennial and annual plants, which would include a green infrastructure in accordance with the agricultural ecosystems.

3) There are no conservation programs for the pollinating species' habitats. *Insufficient monitoring of pollinating insect species,* especially the data about the wild-bee colonies are merely missing.

4) Lack of mechanism for the protection by the state of the bee gene pool and support for the research-improvement works.

Ecosystem services provided by pollinators at the product level

at the product level

Product	Origin	Provided ecosystem services
Honey	Flower nectar and honeydew from aphids.	**Source of feed, pharmaceutical, cosmetology products etc.**
Wax	Wax-producing glands of worker bees	**Cosmetic, pharmaceutical products and candles.**
Propolis	Tree resin	**Applied in natural treatments.**
Pollen (granules)	Flower anthers.	**Food additive.**
Royal jelly	Glands from the worker bee throat.	**Diverse natural use.**
Venom	Abdominal glands of female bees.	**In apitherapy to treat some problems as rheumatism and sciatica.**

at the economic system level

Inflows into the economic system	Origin	Note
Wild plants pollination service	Participate in the in-situ natural trophic chain.	**Pollinators ensure the exclusive link for the vitality of about 50% of wild flora plants**
Agricultural crops pollinating service	Participate in the ex-situ trophic chain.	**Pollinators ensure the increase by about 20-50% of the production of orchards and agricultural lands., Including for:** - **100% of the fruit Spp. from the Fam. Rosaceae;** - **30% of berries and 30% of vegetables** - **50% of agricultural crops: rapeseed, sunflower, buckwheat, fodder crops, species of spices and other.**
Human body health improvement services	Provide ecological products services	**The role of producing cleaner food, more suitable for the human metabolism in a full correlation with life prolongation and health improvement**

THANK YOU.

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For further information, please contact:

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