



Functional agrobiodiversity techniques to support beneficial organisms in organic apple orchards

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Problems in apple growing:

- **Increasing pest damage**
- **More pests – more pesticides**
- **Growing insect resistance**
- **Environmentally unfriendly methods**



<http://utahpests.usu.edu/ipm/htm/fruits/fruit-insect-disease/apple-pear-control03>



http://www.bctfpg.ca/pest_guide/info/35/

Central concept regarding the use of environmentally friendly pest management methods is functional agrobiodiversity.

Functional agrobiodiversity (FAD) refers to those elements of biodiversity on the scale of agricultural fields or landscapes, which provide ecosystem services that support sustainable agricultural production and can also deliver benefits to the environment and the public well-being.

FAD is a techniques developed with the purpose of reducing pest damage and pesticide use by promoting the abundance and diversity of natural enemies in ecological infrastructures.



In the frames of the international CORE Organic Plus project EcoOrchard “Innovative design and management to boost functional biodiversity of organic orchards” data on FAD techniques in the organic apple orchards of Latvia were obtained.

The most wide spread techniques used by growers in Latvia are:

- **hedgerows**
- **habitats for beneficial animals**
- **release of vertebrates**
- **caulescent plants next to the orchards**

Hedgerows

As hedgerows farmers used:

- Deciduous trees - *Tilia cordata*, *Coryllus avelana*, *Betula pendula*
- Coniferous trees - *Picea glauca* etc.



Benefits:

- Shelter and overwintering places for natural enemies
- Restriction of some insect pests
- Pollinator attraction
- Reduces soil erosion, protects from wind
- Protects from frost impact
- Decreases of insecticide, energy use
- Esthetical



Habitats for beneficial animals

- pile of stones or branches –
frogs, toads, hedgehogs, snakes etc.



- bird houses



- various water bodies



- tree branch fences
- roosts for bird landing



Vertebrates

Interviewed farmers in their apple orchards used:

- **various birds**
- **catle**
- **green frogs**

Benefits:

- **insect pest biological control**
- **grass grazing**
- **manure**
- **meat, egg production**
- **esthetical**



<http://www.avianaquamiser.com/archives/2014/09/>



<http://www.trenchmore.co.uk/>

Minimise effects on environmental degradation

Farmers used several techniques:

- **sunflowers next to the orchard**
- ***Trifolium repens* between rows**
- **adapted interrow mowing**
- **reduced tillage under trees**
- **flower stripes**
- **apple trees planting in appropriate dista.**
- **fermented manure with weeds**



http://theenglishappleman.com/journal_2016-03-11-Wild-flowers-and-pollination.asp

Benefits:

- **Increases biological diversity**
- **Polinator attraction**
- **Decreases use of pesticides**
- **Decreases impact on soil**
- **Esthetical**



<https://plantsandapples.com/tag/varieties/>

Aknowledgements

Authors are grateful for the financial support to the project EcoOrchard provided by transnational funding bodies being partners of the EP7 ERAnet project, CORE Organic Plus, and the cofund from the European Commission.





**Thank you for
attention !**