Functional agrobiodiversity techniques to support beneficial organisms in organic apple orchards

L. Ozoliņa-Pole¹, I. Salmane¹, B. Ralle¹, F. Warlop², L. Sigsgaard³

¹ Latvian Plant Protection Research Center, Riga, Latvia
² Groupe de Recherche en Agriculture Biologique, Maison de la Bio, France
³ University of Copenhagen, Faculty of Life Sciences, Denmark
Problems in apple growing:

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

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

http://www.bctfg.ca/pest_guide/info/35/
Central concept regarding the use of environmentally friendly pest management methods is functional agribiodiversity.

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 branche fences
- roosts for bird landing
Vertebrates

Interviewed farmers in their apple orchards used:
• various birds
• cattle
• green frogs

Benefits:
• insect pest biological control
• grass grazing
• manure
• meat, egg production
• estethical

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 distance
• fermented manure with weeds

Benefits:
• Increases biological diversity
• Polinator attraction
• Decreases use of pesticides
• Decreases impact on soil
• Estethical
Aknowledgements

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