Forest in rural landscape – a multi-service provider and/or the harbour of biodiversity

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Potential present of biodiversity

Without humans
Real history with humans

Post-glacial immigration human migration and interference
- Habitat disturbance, or mostly, destruction
- Novel habitats
- Species extinction and immigration

(Carcaillot et al. 2002)

Loss of forests

900a 1900a

(Grigg 1987)

South-Sweden
(Lindbladh et al. 2000)
Estonian forest

Forest land (48-52%)

Within that:
- All deciduous (37.4%)
- Broad-leaved (3-5%)
- Natural-looking (1-3.5%)

(Adermann, Estonian Forest 2009, 2011)

Ecosystem services

Cultural

Provisioning

Regulating

Supporting

Alternative – spatial def
- Global (non-proximal) services
- Local (proximal) services
- In situ services
- Directional (flow related) services
- User-movement related services

Disservices?!

(Constanza et al. 2008)
Services provided by forest

C-stock, but …
… but there is a C-cycle

Provision

Allium ursinum  Laurus nobilis
Cultural

Ivan Shishkin (1889)
Konstantin Savitsky
“Morning in a pine forest”

European network research project (ERA-net) 2012-2014 - Biodiversa project smallFOREST

• To characterize and quantify, but also link, biodiversity and ecosystem services of small forest fragments in agricultural landscapes of temperate Europe
• Interpretation - Multiservice value
• Quantify the relative importance of drivers

As biodiversity and services of large forests are well studied
http://www.biodiversa.org/119
https://www.u-picardie.fr/smallforest/
Mid-field forests

For what?
- Leftovers
- Biodiversity harbors
- Service or Disservice providers
- Landscape greening vs obstacles

(Decocq et al. 2016)
http://dx.doi.org/10.1007/s40725-016-0028-x

8 Regions x 2 landscapes (5x5km) = ca. 650 forest patches
Ecosystem service

\[ ES = f(\text{Habitat } Q; \text{ landscape } Q; \text{ global } C; +?BDiversity) \]

\textbf{Habitat } Q = f (history; management; size; environment; struct.heterogeneity)

\textbf{Landscape } Q = (Matrix; connectivity)

\textbf{Global } C = f(Lat-long; climate)

(Decoq et al. 2016)

http://dx.doi.org/10.1007/s40725-016-0028-x
Ecosystem service – scale!

Habitat quality

Ecosystem services

Landscape structure

Global conditions

+ Biodiversity of all scales

Service quality

Biodiversity- vs functional trait-based properties

Functional diversity

ES provision quality

Fun intensity

Fun stability

Main interest in large forests

(Kütt et al. 2016)

http://dx.doi.org/10.1016/j.ecolind.2016.06.009
Forest patch properties

Forest core & edge
Ancient & Recent habitat

Forest plant biodiversity

Richness

Forest specialists
Forest generalists

Composition

(Valdes et al. 2015)
http://dx.doi.org/10.1111/geb.12345

(Valdes et al. subm)
Biocontrol

Abundance of biocontrol groups

Rauno Kalda

(Kalda et al. Submitted) + http://dx.doi.org/10.1016/j.agee.2014.08.028

Disservice

Ticks (*Ixodes ricinus*) abundance

(Ehrmann et al. 2017) https://doi.org/10.1186/s12898-017-0141-0
Disservice

Scopse snail (*Arianta arbustorum*)

=> Too many!

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https://www.etis.ee/Portal/Persons/Display/4955e43c-8178-4c59-9956-8ed8f41f192?tabId=CV_ENG&lang=ENG