Problematic weed species in spring sown cereals around the Baltic sea – An expert database

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Overview

Implications

Context and Objectives

        Project PRODIVA

                Expert database

Key results and Discussion

        Comparison with weeds found in survey
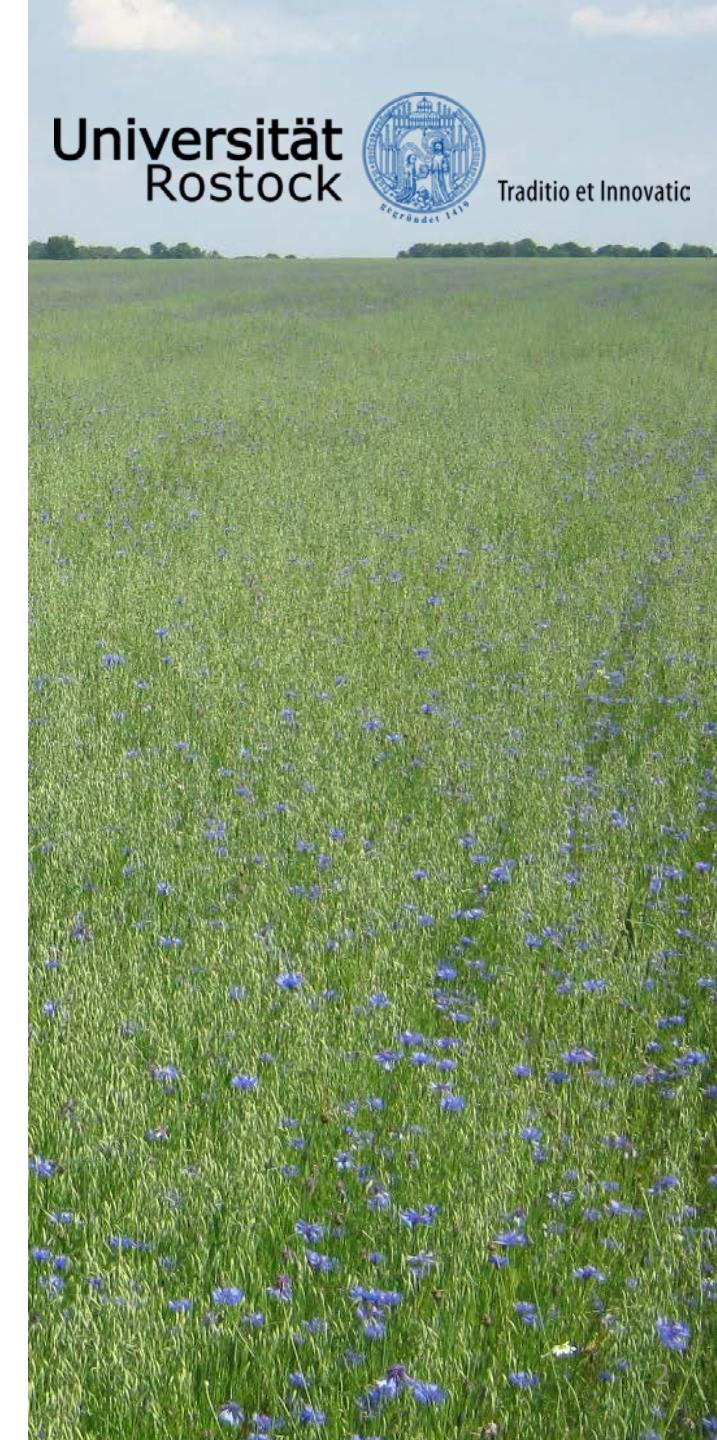
Implications for tuning-up Organic production

Weeds = Bad (?) → quantity and quality

Increased knowledge on 'problematic' weeds

Utilization of Agro-biodiversity for weed control

        Additional tools for farmer

Short context – Organic weed control

Weed reduction strategies in Organic Agriculture:

Direct/physical methods

Mechanical weeding

Thermal treatments

Cultural measures

Crop cultivar

Seedbed preparation

Use of mulches

Systematic methods

Crop diversity in space and time

PRODIVA: **Pro Div**ersity

Better utilization of crop diversification strategies for weed management in North European organic arable cropping systems.

To maintain diverse arable weed vegetation that is manageable in the long-term and could fulfill other necessary system-functions including support of beneficial organisms.
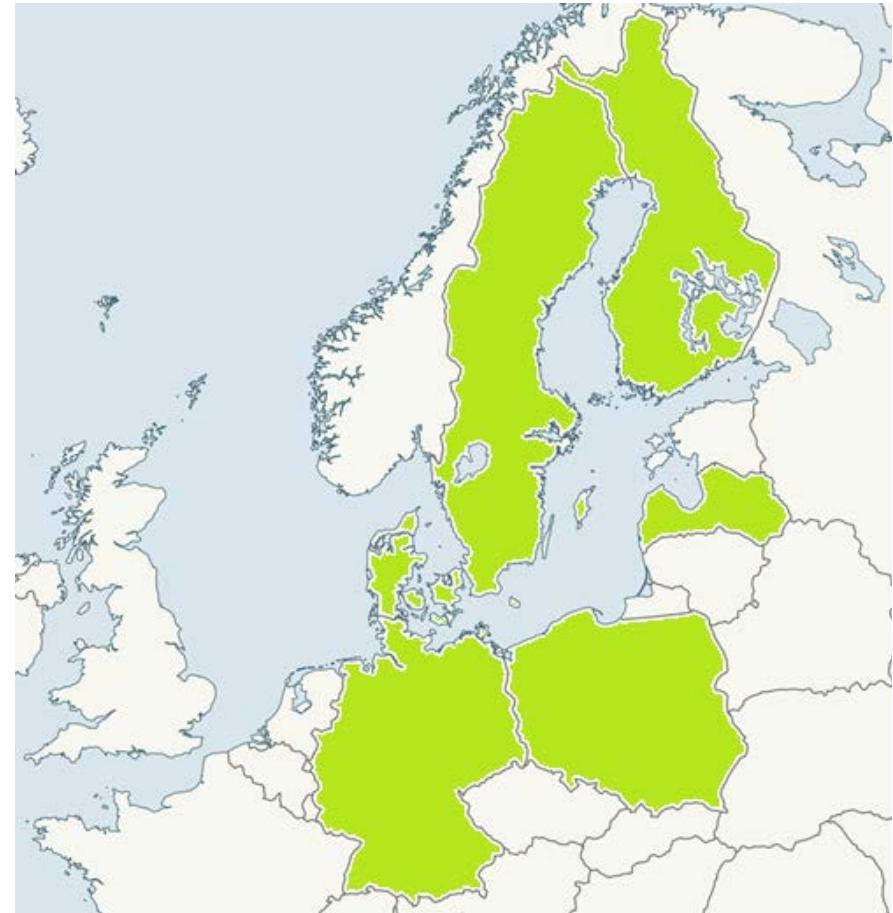
Setting the scene

Better utilization of crop diversification for weed management in North European organic arable cropping systems.

Maintain weed diversity that is manageable and provides ecosystem services

Goal

Objectives

Methods

Analysis

Setting the scene

Better utilization of crop diversification for weed management in North European organic arable cropping systems.

Maintain weed diversity that is manageable and provides ecosystem services

Identify current utilisation and effect of **crop diversification strategies** on weeds in organic arable cropping systems in practice.

Objectives

Methods

Analysis

Setting the scene

Better utilization of crop diversification for weed management in North European organic arable cropping systems.

Maintain weed diversity that is manageable and provides ecosystem services

Identify current utilisation and effect of **crop diversification strategies** on weeds in organic arable cropping systems in practice.

Identify existing practical weed challenges

Investigate the role of crop diversification strategies on weed vegetation on farms

Cluster weed species into groups in accordance to their susceptibility for the applied crop diversification strategies.

Methods

Analysis

Setting the scene

Better utilization of crop diversification for weed management in North European organic arable cropping systems.

Maintain weed diversity that is manageable and provides ecosystem services

Identify current utilisation and effect of **crop diversification strategies** on weeds in organic arable cropping systems.

Identify existing practical weed challenges

Investigate the role of crop diversification strategies on weed vegetation on farms

Cluster weed species into groups in accordance to their susceptibility for the applied crop diversification strategies.

Method 1: Expert database

Analysis

Setting the scene

Better utilization of crop diversification for weed management in North European organic arable cropping systems.

Maintain weed diversity that is manageable and provides ecosystem services

Identify current utilisation and effect of **crop diversification strategies** on weeds in organic arable cropping systems.

| Identify existing practical weed challenges | Investigate the role of crop diversification strategies on weed vegetation on farms | Cluster weed species into groups in accordance to their susceptibility for the applied crop diversification strategies. |

Method 1: Expert database

Method 2: Weed survey and field history variables

Analysis

Expert database

Ranking problematic weed species in Organic spring sown cereals for every country.

Literature research in national scientific and grey literature

Information from extension services and other experts

Formulation of top 10 problematic annuals and perennials

Data collected

Project context

Folder for extension services and farmers

Weed types

Working with subjective perception / Categorization

Annuals:

Bodybuilders

Early birds

Plebeian

Perennials:

Indestructibles

Grassland

Expert database

Geographical distribution of challenging weed species

Current knowledge in organic arable farming in the Baltic sea region

CORE organic II

Latin Name	DE	DK	SE	FI	LV	PL	Weed type
Chenopodium album	x	x	x	x	x	x	Bodybuilder
Polygonum spp.	x	x	x	x	x	x	Bodybuilder
Centaurea cyanus	x	x	x		x	x	Bodybuilder
Galeopsis spp.		x	x	x	x	x	Bodybuilder
Raphanus raphanistrum	x					x	Bodybuilder
Sinapis arvensis		x	x				Bodybuilder
Galeopsis tetrahit			x			x	Bodybuilder
Alopecurus myosuroides	x						Bodybuilder
Avena fatua				x			Bodybuilder
Brassica rapa ssp. Campestris		x					Bodybuilder
Stellaria media	x	x		x		x	Early bird
Galium aparine	x		x			x	Early bird
Matricaria inodora		x				x	Early bird
Apera spica-venti	x				x		Early bird
Lamium purpureum				x	x		Early bird
Viola arvensis				x	x		Early bird
Anthemis arvensis						x	Early bird
Papaver rhoeas	x						Early bird
Galinsoga parviflora						x	Early bird
Thlaspi arvensis			x				Early bird
Spergula arvensis			x	x			Plebeian
Erysimum cheiranthoides				x			Plebeian
Fumaria officinalis					x		Plebeian
Anchusa arvensis	x						Plebeian
Matricaria discoidea			x				Plebeian
Myosotis arvensis				x			Plebeian
Veronica arvensis					x		Plebeian
Amsinckia micrantha		x					Plebeian
Elytrigia repens	x	x	x	x	x	x	Indestructibles
Cirsium arvensis	x	x	x	x	x	x	Indestructibles
Equisetum arvense		x	x	x	x	x	Indestructibles
Sonchus arvensis		x	x	x	x		Indestructibles
Rumex spp.	x		x	x			Indestructibles
Tussilago farfara		x	x	x			Grassland
Ranunculus repens			x	x			Grassland
Taraxacum officinale			x	x			Grassland
Artemisia vulgaris		x			x		Grassland

Finland

| Species	Type
Chenopodium album	Bodybuilder
Stellaria media	Early bird
Spergula arvensis	Plebeian
Galeopsis spp.	Bodybuilder
Polygonum persicaria	Bodybuilder
Erysimum cheiranthoides	Plebeian
Viola arvensis	Early bird
Avena fatua	Bodybuilder
Myosotis arvensis	Plebeian
Lamium purpureum	Early bird
Elytrigia repens	Indestructible
Sonchus arvensis	Indestructible
Cirsium arvensis	Indestructible
Taraxacum officinale	Grassland

Discussion

Shared species

Specific species

Translation and distribution into participating countries

Target species/groups in project

Comparison with survey data
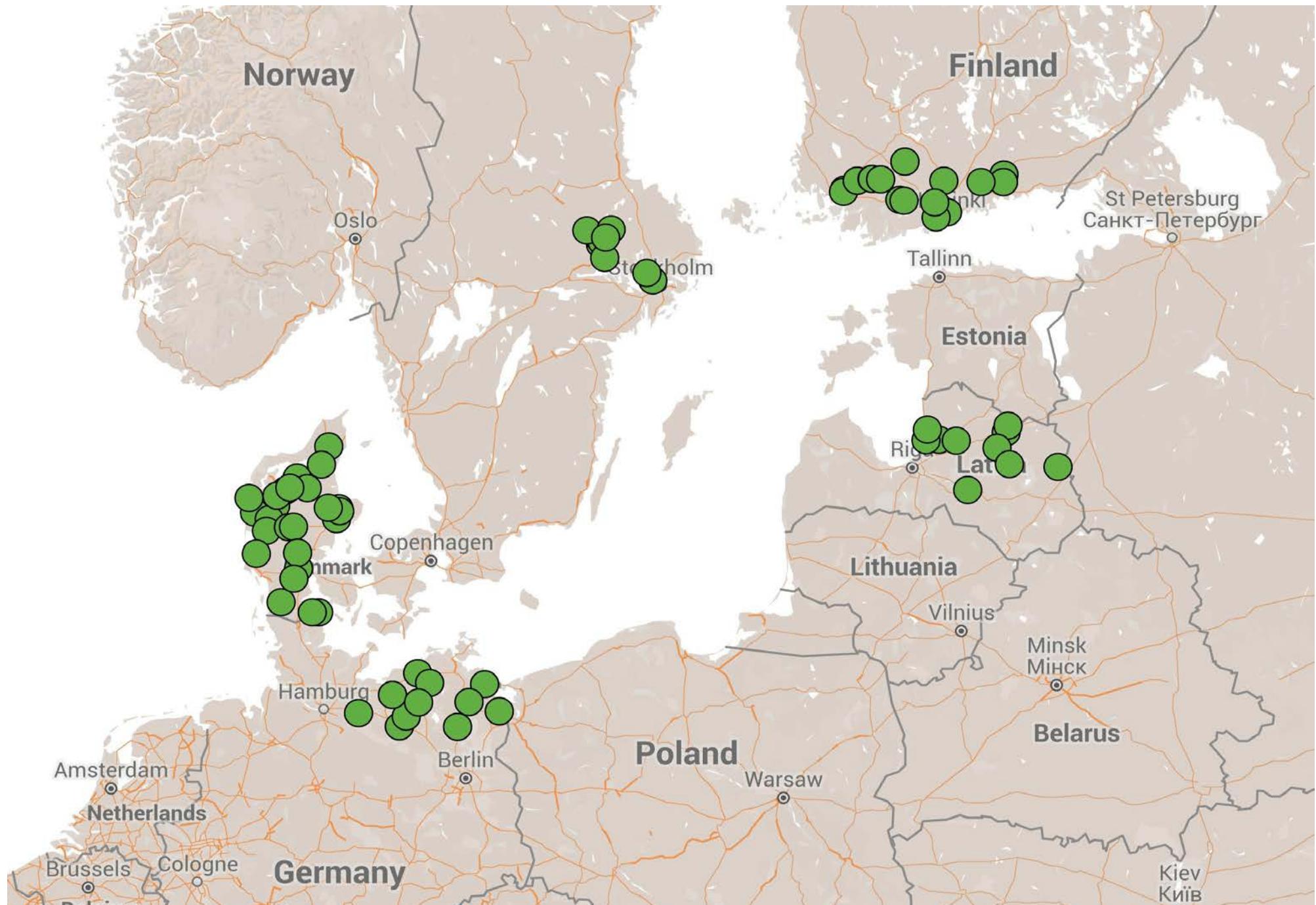
Expert database and weed survey

Germany "Problem"	2015 Dens. (100m2)	2016
STEME	CENCY	CHEAL
GALAP	POLCO	POLCO
CHEAL	POLAV	CENCY
APESV	VIOAR	MATIN
ALOMY	CHEAL	GASPA
CENCY	SINAR	VIOAR
POLAV	CAPBP	VERPE
PAPRH	MYOAR	ANTAR
RAPRA	ANTAR	MYOAR
LYCAR	VERPE	RAPRA
CIRAR	VICSS	AGRRE
RUMSS	TRFRE	TRFRE
AGRRE	AGRRE	VICSS
	CIRAR	TAROF
	EQUAR	LOLPE

Finland "Problem"	2015 Dens. (100m2)	2016
CHEAL	STEME	CHEAL
STEME	CHEAL	LAMPU
SPRAR	SPRAR	GALSP
GAESS	GALSP	FUMOF
POLLA	LAMPU	MATIN
ERYCH	MATIN	STEME
VIOAR	GAESS	LAPCO
AVEFA	POLLA	GAEBI
MYOAR	ERYCH	GAESP
LAMPU	LAPCO	ERYCH
AGRRE	SONAR	SONAR
SONAR	CIRAR	AGRRE
CIRAR	TAROF	CIRAR
TAROF	AGRRE	TUSFA
TUSFA	RUMLO	RUMLO
RANRE		
PLAMA		
EQUAR		
RUMSS		

Thank you for your attention!

Latin Name	Germany	Denmark	Sweden	Finland	Latvia	Poland	Type
Chenopodium album	x	x	x	x	x	x	Bodybuilder
Polygonum spp.	x	x	x	x	x	x	Bodybuilder
Centaurea cyanus	x	x	x		x	x	Bodybuilder
Galeopsis spp.		x	x	x	x	x	Bodybuilder
Stellaria media	x	x		x		x	Early bird
Galium aparine	x			x		x	Early bird
Raphanus raphanistrum	x					x	Bodybuilder
Sinapis arvensis		x	x				Bodybuilder
Galeopsis tetrahit				x		x	Bodybuilder
Matricaria inodora		x				x	Early bird
Apera spica-venti	x				x		Early bird
Lamium purpureum				x	x		Early bird
Viola arvensis				x	x		Early bird
Spergula arvensis			x	x			Plebeian
Alopecurus myosuroides	x						Bodybuilder
Avena fatua				x			Bodybuilder
Anthemis arvensis						x	Early bird
Papaver rhoeas	x						Early bird
Galinsoga parviflora						x	Early bird
Erysimum cheiranthoides				x			Plebeian
Fumaria officinalis					x		Plebeian
Anchusa arvensis	x						Plebeian
Matricaria discoidea			x				Plebeian
Myosotis arvensis				x			Plebeian
Brassica rapa ssp.		x					Bodybuilder
Thlaspi arvensis			x				Early bird
Veronica arvensis					x		Plebeian
Amsinckia micrantha		x					Plebeian
Elytrigia repens	x	x	x	x	x	x	Indestructibles
Cirsium arvense	x	x	x	x	x	x	Indestructibles
Equisetum arvense		x	x	x	x	x	Indestructibles
Sonchus arvensis		x	x	x	x		Indestructibles
Rumex spp.	x		x	x			Indestructibles
Tussilago farfara		x	x	x			Plebeian
Ranunculus repens			x	x			Grassland
Taraxacum officinale			x	x			Grassland
Artemisia vulgaris		x			x		Grassland

Weed survey

	2015		2016		
	Farms	Fields	Farms	Fields	Total Fields
Germany	11	22	10	20	42
Denmark	25	40	10	20	60
Finland	15	22	13	22	45
Latvia	10	20	10	20	40
Sweden	10	21	10	20	41
Poland	-	-	7	7	7
Total		125		110	235

Expert database
Annuals
CHEAL
POLSS
CENCY
GAESS
STEME
GALAP
RAPRA
SINAR
GALTE
MATIN
Perennials
AGRRE
CIRAR
EQUAR
SONAR
RUMSS

Expert database

Annuals

	Germany	Denmark	Sweden	Finland	Latvia	Poland
1	STEME	SINAR	GALTE	CHEAL	POLCO	CHEAL
2	GALAP	BRSRA	MATMT	STEME	VIOAR	STEME
3	CHEAL	GALSS	POLPE	SPRAR	CHEAL	CENCY
4	APESV	MATIN	GALAP	GAESS	GALSS	POLCO
5	ALOMY	AMSME	CHEAL	POLLA	VERAR	GASPA
6	CENCY	POLPE	POLAV	ERYCH	LAMPU	MATIN
7	POLAV	CENCY	SPRAR	VIOAR	POLSS	ANTAR
8	PAPRH	CHEAL	SINAR	AVEFA	FUMOF	GALTE
9	RAPRA	STEME	THLAR	MYOAR	CENCY	GALAP
10	LYCAR		CENCY	LAMPU	APESV	RAPRA

Expert database

Perennials

	Germany	Denmark	Sweden	Finland	Latvia	Poland
1	CIRAR	CIRAR	CIRAR	AGRRE	AGRRE	CIRAR
2	RUMSS	AGRRE	AGRRE	SONAR	EQUAR	SONAR
3	AGRRE	TUSFA	SONAR	CIRAR	CIRAR	AGRRE
4		SONAR	STAPA	TAROF	SONAR	EQUAR
5		EQUAR	TAROF	TUSFA	ARTVU	
6			TUSFA	RANRE		
7			RANRE	PLAMA		
8			RUMCR	EQUAR		
9			EQUAR	RUMSS		

PRODIVA Work packages

Work package 0: Project coordination
        Location: *Denmark*, Bo Melander

Work package 1: Weed dynamics in crop rotations with **cover crops**
        Location: *Finland, Latvia, Denmark,* Jukka Salonen

Work package 2: **Crop mixtures** for weed suppression
        Location: *Sweden, Poland*, Anneli Lundkvist

Work package 3: **Variety mixtures** for weed suppression
        Location: *Denmark, Poland, Latvia*, Bo Melander

Work package 4: Crop diversification and weed vegetation **on farms**
        Location: *Germany, Denmark, Sweden, Finland, Latvia*, Bärbel Gerowitt, Merel Hofmeijer

Work package 5: Project dissemination
        Location: *Germany, Denmark, Sweden, Finland, Latvia, Poland*, Bärbel Gerowitt