



Geographical distribution of challenging weed species



Current knowledge in organic arable farming
in the Baltic sea region



Editor: Merel A. J. Hofmeijer, Rostock University, Germany

merel.hofmeijer@uni-rostock.de

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PRODIVA Project partners and institutes:

Prof. Dr. B. Melander. Aarhus University, Department of Agroecology, (lead partner), Denmark

Prof. Dr. B. Gerowitt. University of Rostock, Crop Health, Rostock, Germany

Dr. R. Krawczyk. Institute of Plant Protection, Department of Weed Science and Plant Protection Techniques, Poland

Dr. J. Salonen. Natural Resources Institute Finland, Jokioinen, Finland

Prof. Dr. T. Verwijst. Swedish University of Agricultural Sciences, Crop Production Ecology, Uppsala, Sweden

Dr. L. Zarina. State Priekuli Plant Breeding Institute, Field crop management, Priekuli, Latvia

Introduction

They create a great source of agro biodiversity, generating habitats and food sources for other organisms; yet weeds have always posed the greatest challenge in organic agriculture from the perspective of production.

Because of the specific agricultural management of this farming system, several groups of weed species have naturally adjusted. These can be highly competitive to the crop, acquire high inputs to remove and/or spread rapidly.

In this leaflet we will describe the most challenging weed species in organic spring sown cereals in the geographical area of the Baltic sea, based on existing literature and information provided by extension services.

We will show and discuss their distribution from country to country and propose a classification system.

This research is conducted within the international project of PRODIVA, part of Core Organic, whose research interest is the crop and weed biodiversity interaction in organic arable agriculture. Countries involved are: Denmark, Finland, Germany, Latvia, Poland and Sweden.

Weed Types

There is no such thing as ‘that one challenging weed specie’; there are many weed species that in different ways pose a challenge to the crop. This is based on their survival strategies, physiology, life cycle and competition pressure for water, light and nutrients.

From these elements we composed five different weed classes, based on the weed classes as mentioned by Holzner and Glauningner (2005)*, dividing weed species into classes according to their specific strategies.

Annuals:

- The Bodybuilders

These are the strong developing, high biomass, highly visible, high competitive species of annuals. These include *Chenopodium album*, *Centaurea cyanus*, *Avena fatua* etc.

- The Early Birds

These annuals rely on a quick establishment in spring and can be competitive during the establishment of the crop. However, later in the season they tend to lose their competitiveness if not densely grown. Think of *Stellaria media*, *Lamium purpureum*, *Viola arvensis*. This group also includes the more flexible and opportunist weed species like *Matricaria inodorata*, *Apera spica-venti* and *Papaver rhoeas*. These species are also less competitive to the crop.

- The Plebeians

The species of annuals who are often visibly present, but rarely have an competitive impact. Sometimes form a problem when occurring in high densities. These are species like *Spergula arvensis*, *Fumaria officinalis* and *Myosotis arvensis*.

Perennials

- The Zombies

The weed species in this category of perennial often have strong root systems and are extremely resilient. Therefor they need a lot of energy input to get rid of. They can be strong competitors. Examples of species are *Elytrigia repens*, *Cirsium arvense* and *Sonchus arvensis*.

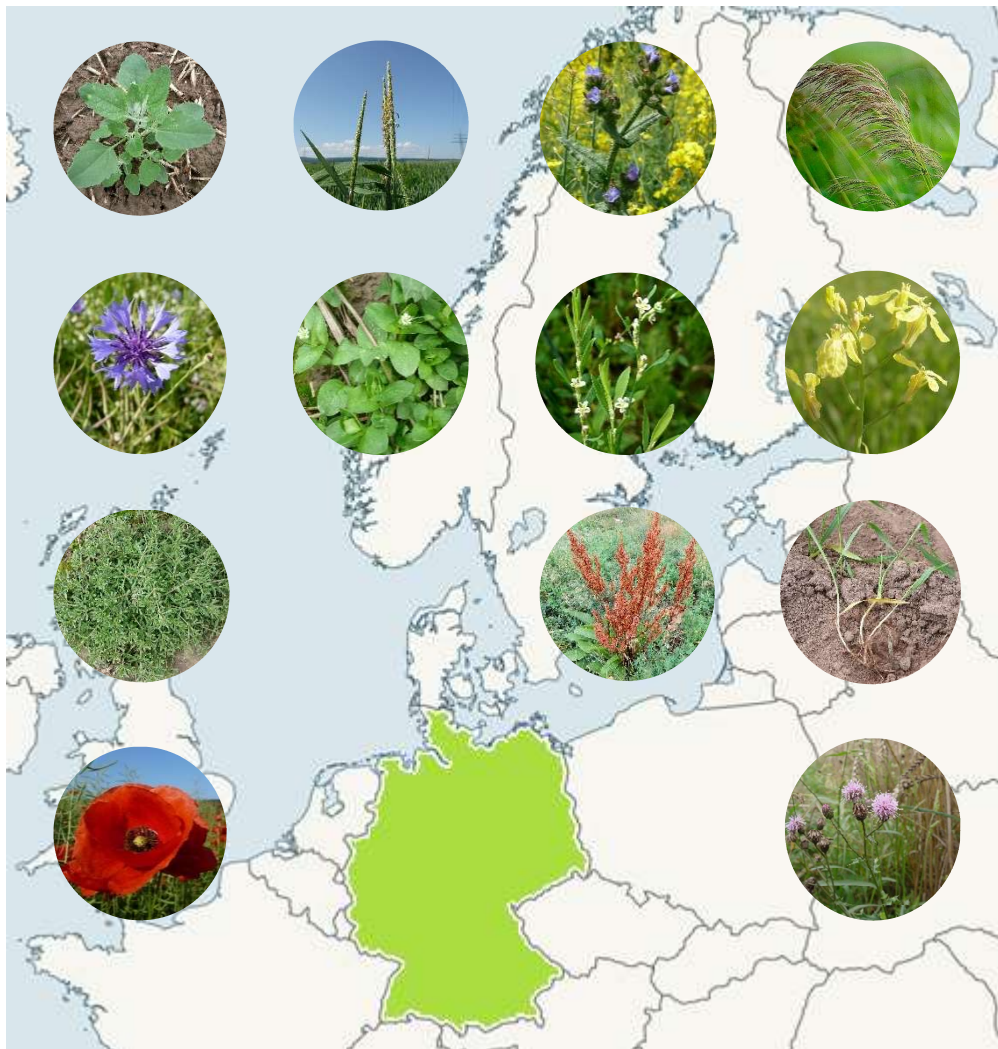
- The grassland species

These species are normally common weeds in grassland systems. They are seen wandering into the arable fields, benefiting of the grass-clover ley often implemented in organic crop rotations. Some of the species here are *Taraxacum officinale* and *Ranunculus repens*.

Overview species

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

Germany



Species	Type
<i>Stellaria media</i>	Early bird
<i>Galium aparine</i>	Bodybuilder
<i>Chenopodium album</i>	Bodybuilder
<i>Apera spica-venti</i>	Early bird
<i>Alopecurus myosuroides</i>	Bodybuilder
<i>Centaurea cyanus</i>	Bodybuilder
<i>Polygonum aviculare</i>	Bodybuilder
<i>Papaver rhoeas</i>	Early bird
<i>Raphanus raphanistrum</i>	Bodybuilder
<i>Anchusa arvensis</i>	Plebeian
<i>Cirsium arvense</i>	Zombies
<i>Rumex spp.</i>	Zombies
<i>Elytrigia repens</i>	Zombies

Poland



Species	Type
<i>Chenopodium album</i>	Bodybuilder
<i>Stellaria media</i>	Early bird
<i>Centaurea cyanus</i>	Bodybuilder
<i>Polygonum convolvulus</i>	Bodybuilder
<i>Galinsoga parviflora</i>	Early bird
<i>Matricaria inodora</i>	Early bird
<i>Anthemis arvensis</i>	Early bird
<i>Galeopsis tetrahit</i>	Bodybuilder
<i>Galium aparine</i>	Bodybuilder
<i>Raphanus raphanistrum</i>	Bodybuilder
<i>Cirsium arvensis</i>	Zombies
<i>Elytrigia repens</i>	Zombies
<i>Equisetum arvense</i>	Zombies

Latvia



Species	Type
<i>Polygonum convolvulus</i>	Bodybuilder
<i>Viola arvensis</i>	Early bird
<i>Chenopodium album</i>	Bodybuilder
<i>Galeopsis spp.</i>	Bodybuilder
<i>Veronica arvensis</i>	Plebeian
<i>Lamium purpureum</i>	Early bird
<i>Fumaria officinalis</i>	Plebeian
<i>Centaurea cyanus</i>	Bodybuilder
<i>Apera spica-venti</i>	Early bird
<i>Elytrigia repens</i>	Zombies
<i>Equisetum arvense</i>	Zombies
<i>Cirsium arvense</i>	Zombies
<i>Sonchus arvensis</i>	Zombies
<i>Artemisia vulgaris</i>	Grassland

Finland



Species	Type
<i>Chenopodium album</i>	Bodybuilder
<i>Stellaria media</i>	Early bird
<i>Spargula arvensis</i>	Plebeian
<i>Galeopsis spp.</i>	Bodybuilder
<i>Polygonum persicaria</i>	Bodybuilder
<i>Erysimum cheiranthoides</i>	Plebeian
<i>Viola arvensis</i>	Early birds
<i>Avena fatua</i>	Bodybuilder
<i>Myosotis arvensis</i>	Plebeian
<i>Lamium purpureum</i>	Early bird
<i>Elytrigia repens</i>	Zombies
<i>Sonchus arvensis</i>	Zombies
<i>Cirsium arvensis</i>	Zombies
<i>Taraxacum officinale</i>	Grassland

Denmark



Species	Type
<i>Sinapsis arvensis</i>	Bodybuilder
<i>Brassica rapa</i>	Bodybuilder
<i>Galeopsis</i> spp.	Bodybuilder
<i>Tripleurospermum maritimum</i> ssp. <i>Inodorum</i>	Early bird
<i>Amsinckia micrantha</i>	Plebeian
<i>Polygonum persicaria</i>	Bodybuilder
<i>Centaurea cyanus</i>	Bodybuilder
<i>Chenopodium album</i>	Bodybuilder
<i>Stellaria media</i>	Early bird
<i>Cirsium arvense</i>	Zombies
<i>Elytrigia repens</i>	Zombies
<i>Tussilago farfara</i>	Plebeian
<i>Sonchus arvensis</i>	Zombies
<i>Artemisia vulgaris</i>	Grassland
<i>Equisetum arvense</i>	Zombies

Sweden



Species	Type
<i>Galeopsis tetrahit</i>	Bodybuilder
<i>Matricaria discoidea</i>	Early bird
<i>Polygonum persicaria</i>	Bodybuilder
<i>Galium aparine</i>	Bodybuilder
<i>Chenopodium album</i>	Bodybuilder
<i>Polygonum aviculare</i>	Bodybuilder
<i>Spergula arvensis</i>	Plebeian
<i>Sinapis arvensis</i>	Bodybuilder
<i>Thlaspi arvensis</i>	Plebeian
<i>Centaurea cyanus</i>	Bodybuilder
<i>Cirsium arvense</i>	Zombies
<i>Elytrigia repens</i>	Zombies
<i>Sonchus arvensis</i>	Zombies
<i>Taraxacum officinale</i>	Grassland

PRODIVA

Interesting to note is that most of the most challenging weeds stem from the categories of Bodybuilders and Zombies, this most likely due to their competitiveness with the crop and resistance against weed control. Most of these species are actually shared between most counties. The country specific species are more often member of the Early birds, Plebeian or even grassland species. This is probably caused by the distribution of weed species and their adaption to their local environment.

We have to consider that the competitiveness of weeds relies heavily on local conditions, such as soil type and climate. But the similarities are noteworthy.

This data will be further used in the research of the PRODIVA project, comparing this database with weed communities found in the field.

To get to know more about PRODIVA and Core Organic please visit the website:

<http://coreorganicplus.org/research-rojects/prodiva/>

or contact: bo.melander@agro.au.dk.

Photo sources



Alopecurus myosuroides: B. Gerowitt

Anchusa arvensis: B. Gerowitt

Apera spica-venti: <http://linnaeus.nrm.se>, Anna-Lena Anderberg

Artemisia vulgaris: R. Krawczyk

Avena fatua: B. Gerowitt



Centaurea cyanus: B. Gerowitt

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Equisetum arvense: <https://en.wikipedia.org>, Free commons



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Lamium purpureum: R. Krawczyk

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Viola arvensis: R. Krawczyk

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