Problematic weed species in organic arable agriculture around the Baltic Sea

An expert database

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Introduction

Weeds remain the main constrain for organic crop production. However, the study of Turner et al. (2007) showed, this increased weed cover, within manageable limits, is not considered a major concern to the organic farmers and can prove positive for ecosystem services. What tends to pose a challenge is the build-up of certain highly competitive weed species which require high input control measures. Therefore we consider these specific weeds to be problematic. Especially perennials can be a real challenge in organic arable systems (van Elsen, 2000).

Methods

The CORE Organic PRODIVA project, a collaboration between northern European weed research institutions, aims to improve utilization of crop diversification strategies for weed management and still maintain a diverse weed flora. To kick-start the research an expert database was compiled to create an understanding on local problematic weed species, in organic cereal production in the Baltic Sea region.

A literature review was conducted in the national literature from all countries involved in the PRODIVA project (DE, DK, SE, FI, LV and PL). Sources considered were scientific literature, specialized literature, grey literature and the knowledge of extension services and specialist in the field. Studied was which species were considered 'problematic' considering crop-weed competition, weed cover and controllability. This focussed on organically grown spring sown cereals. From this, information on weed species lists were composed based on the frequency of a weed species mentioned and how problematic they are. The weed species were divided into five types loosely based on the categorization of character trades from Holzner and Glauninger (2005), so to make identification more comprehensive.

The results and information have been prepared as a flyer that will be made accessible to stakeholders, such as extension services and farmers in their local languages.

Results and Discussion

After analysing the data and listing the weed species (Table 1), the species were divided in five groups, based on competition trades. Although the types are based on the system proposed by Holzner and Glauninger (2005) in the more southern continental region of Austria, the types described here are corrected for the more northern boreal- maritime climate found in the Baltic Sea region.

Most of the most problematic weeds stem from the categories of Bodybuilders and Indestructibles, this most likely due to their high competitiveness and amount of control measures required. Species belonging to these weed types are mentioned to be 'problematic' in the majority of countries. The country specific species are more often member of the Early Birds or Plebeians or even Grassland species. This is probably caused by the distribution of weed species and their specific adaption to their local environment, such as climatic conditions and soils. We have to consider that the competitiveness of weeds relies heavily on local conditions as well, but the similarities are noteworthy.

For more information on the project PRODIVA please visit the website: http://coreorganicplus.org/research-projects/prodiva/. The project runs from 2015-2018.





Elsen T van (2000) Species diversity as a task for organic agriculture in Europe. Agriculture, Ecosystems & Environment 77(1) 101-109.
Holzner W, Glauninger J. (2005) Ackerunkräuter: Bestimmung, Biologie, landwirtschaftliche Bedeutung. Stocker.
Turner R J, Davies G, Moore H, Grundy A C & Mead A (2007) Organic weed management: a review of the current UK farmer perspective. Crop Protection, 26(3), 377-382.

Latin Name	DE	DK	SE	FI	LV	PL	Weed type
Annuals							
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. Campestris		x					Bodybuilder
Thlaspi arvensis			x				Early bird
Veronica arvensis					x		Plebeian
Amsinckia micrantha		x					Plebeian
Perennials							
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

Table 1: Problematic weed species most often mentioned in national literature and by local extension services. Divided into annuals and perennials. Germany (DE), Denmark (DK), Sweden (SE), Finland (FI), Latvia (LV) and Poland (PL). **The Bodybuilders** are weeds species that develop a lot of biomass rapidly and are highly competitive. **The Early Birds**, these annuals rely on a quick establishment in spring and can be competitive during the establishment of the crop. This type also includes the more flexible and opportunist annuals. **The Plebeian** are annuals that are visibly present and can occur in high densities, but rarely have a competitive impact. **The Indestructibles** are a category of perennial that often have persistent root systems and are resilient, hard to control and can be strong competitors. **The Grassland** species are common weeds in grassland systems.

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