

Problematic weed species in spring sown cereals around the Baltic Sea - an expert database.

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Implications

Specific annual and perennial weeds are a perpetual challenge in the process of tuning up sustainable organic production. To utilize the perspective of agro-biodiversity would both improve crop yields and conserve the ecosystem services of organic production. The successful use of crop diversity strategies provides an additional tool for the farmers, giving them a) an overview of problematic weed species and b) the opportunity to plan their crop diversity based weed management for the future.

Background and Objectives

Weeds remain to be the main constrain on organic crop productivity (Penfold et al. 1995, Clark et al. 1998, Turner et al. 2007) However, they serve multiple ecosystem services and only a few species prove problematic for both the crop and in the farmers' perception. The international PRODIVA project studies the effect of crop diversity strategies on the diversity of weed communities, hypothesizing that by increasing the weed diversity, the development of problematic weeds will be mitigated. Before this can be studied, an inventory of the 'problem' species should be compiled, to be able to target these species within the proceedings of the project. The findings are made available to local stakeholders.

Key results and Discussion

On basis of the international literature review we proposed five weed types. The "Bodybuilders": annuals that develop high biomass and are highly competitive. The "Early Birds": annuals that rely on a quick establishment in spring, also includes the more flexible and opportunist annuals. The "Plebeian": annuals that can occur in high densities, but rarely have a competitive impact. The "Indestructibles": perennials that have strong root systems and are extremely resilient, hard to control and very competitive. The "Grassland": perennials that are common weeds in grassland systems (See Table 1). The majority of the most problematic weeds stem from the categories of "Bodybuilders" and "Indestructibles", likely due to their high competitiveness and amount of control measures required. This is coherent with the sentiment expressed by farmers in the study of Turner (2007). Species belonging to these two weed types are mentioned to be 'problematic' in the majority of countries. The country specific species are often members of the Early Birds or the Plebeians or even the 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.

Methodology

A preparatory study was carried out to list the most problematic weed species in spring sown cereals in the countries involved with PRODIVA (DE, DK, SE, FI, LV, PL). For this a literature review was conducted in all participating countries, collecting local sources including grey literature. This was combined with the opinion of local extension services and other weed experts. From this a list of 10 most problematic weeds was deducted for each country. Furthermore, the weed species were divided into five types loosely based on the categorization of character traits from Holzner and Glauningner (2005), so to make identification as a 'problematic' weed species more comprehensive.

References

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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).

Latin Name	DE	DK	SE	FI	LV	PL	Weed type
<i>Annuals</i>							
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
<i>Perennials</i>							
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