

# Growing cover crops in organic arable crop rotations: Best practices from Denmark

## Problem

Reduced soil quality, soil erosion, nutrient losses and high weed pressure are common challenges in arable farming. Cover crops can help to overcome these problems. But they are 'yet another expense' and might compete with the main crop for water, light and nutrients. Thus, successful implementation of cover crops requires knowledge of where in the rotation to grow them, which species to grow, and when and how to manage them.

## Solution

Growing cover crops solves many of the problems related to arable farming. Based on extensive experiences with cover crops in Denmark, SEGES has drawn conclusions for management of cover crops in arable rotations.

## Outcome

When sown correctly at the right time, in the right position within the rotation, cover crops retain nutrients, conserve water, prevent soil erosion, improve soil fertility and quality, and suppress weeds. Growing cover crops is recognized as a climate-smart agricultural practice.

## Practical recommendation

### Where to position and when to time cover crops in the rotation?

- Grow cover crops in the 1<sup>st</sup> and 2<sup>nd</sup> year after ploughing of clover-grass to avoid nitrogen losses.
- Grow nitrogen fixing cover crops on soils with low fertility.
- Sow cover crops into or immediately after the main crop. In row crops, sow the cover crop in combination with the last hoeing. If the harvest of the main crop is rather early, sow the cover crop after harvest.
- The earlier a cover crop is sown in August, less nitrogen is lost. Each day of delay in sowing a cruciferous cover crop in August results in loss of about 2 kg of N per ha.
- Do not sow cruciferous cover crops into main crops shortly before the harvest, as weed competition may be too high for successful establishment of the cover crop.
- Cover crops sown in spring usually establish well and safely. For spring-sown cover crops use clover mix rather than ryegrass to satisfy nitrogen needs.
- On sandy soils with irrigation, undersow spring crops with wide row distances after the main crop has developed 1-2 nodes high to allow hoeing of the main crop in early stages.
- In winter crops, sow cover crops (clover mix rather than ryegrass) in spring as early as possible.
- Use cover crops after application of large amounts of solid manure, as it helps to retain the nitrogen.
- In lupines or broad beans, undersow a cover crop followed by a spring crop the next year. If a winter crop is chosen instead, perennial weeds might flourish.

## Applicability box

### Theme

Soil quality and fertility, Nutrient management, Pest control, Weed management

### Geographical coverage

Cool, temperate climate

### Application time

August/spring (in the Danish context)

### Required time

No additional time required

### Period of impact

Succeeding crop

### Equipment

Regular sowing equipment

### Best in

All organic agricultural crop rotations

## Cover crops and weed control

- Problems with creeping thistle, sow-thistle and coltsfoot do not rule out cover crops: Sow the cover crop immediately after an early harvest and ploughing. Repeat ploughing in spring before sowing a spring crop.
- To reduce couch-grass, mechanical treatment in autumn is more efficient than growing a cover crop.

## Choice of cover crop species

	Time of sowing	Main crop competition	Soil type	Species	Amount kg/ha
Small N-pool in field	Spring	Minor competition (e.g. weakly fertilized spring wheat or barley)	All soil types	Ryegrass (early)	10
				White clover + Ryegrass	2 + 8
		Major competition (e.g. oats, well-established winter crops)	All soil types	Ryegrass (early)	10
				Red clover + Ryegrass	3 + 8
	After harvest		Sandy soils	Winter rape	6
				Winter vetch + Rye	40 + 40
			Clayey soils	Yellow mustard or Fodder radish	8 12
				Common vetch + Yellow mustard	30 + 5
Large N-pool in field	Spring	Minor competition	All soil types	Ryegrass (early) or Ryegrass + Chicory	10 5 + 3
		Major competition	All soil types	Italian ryegrass	10
	After harvest		Sandy soils	Winter rape	6
				Winter rape + Rye	3 + 40
			Clayey soils	Yellow mustard or Fodder radish	8 12
				Winter rape + Rye	3 + 40

Figure: Recommended cover crop species and combinations based on N-availability, timing, soil types and crop competition.

## Further information

- [https://orgprints.org/31133/12/askegaard-2016-ok-net-arable-leaflets-efterafgroeder\\_fakta.pdf](https://orgprints.org/31133/12/askegaard-2016-ok-net-arable-leaflets-efterafgroeder_fakta.pdf) (Danish fact-sheet)

Use the comment section on the [Farmknowledge platform](#) to share your experiences with other farmers, advisors and scientists! If you have any questions concerning the method, please contact the author of the practice abstract by e-mail.



## About this practice abstract and OK-Net Arable

### Publishers:

SEGES P/S, Agro Food Park 15, DK-8200 Aarhus N, Denmark  
Phone +45 87 40 50 00, info@seges.dk, www.seges.dk

IFOAM EU, Rue du Commerce 124, BE-1000 Brussels, Belgium  
Phone +32 2 280 12 23, info@ifoam-eu.org, www.ifoam-eu.org

**Author:** Margrethe Askegaard, mga@seges.dk

**Language editing:** Simon Moakes (FiBL)

**Permalink:** [Orgprints.org/31051](https://orgprints.org/31051)

**OK-Net Arable:** This practice abstract was elaborated in the Organic Knowledge Network Arable project. The project is running from March 2015 to February 2018. OK-Net Arable promotes exchange of knowledge among farmers, farm advisers and scientists with the aim to increase

productivity and quality in organic arable cropping all over Europe.

**Project website:** [www.ok-net-arable.eu](http://www.ok-net-arable.eu)

**Project partners:** IFOAM EU Group (project coordinator), BE; Organic Research Centre, UK; Bioland Beratung GmbH, DE; Aarhus University (ICROFS), DK; Associazione Italiana, per l'Agricoltura Biologica (AIAB), IT; European Forum for Agricultural and Rural Advisory Services (EUFRAS); Centro Internazionale di Alti Studi Agronomici Mediterranei - Istituto Agronomico Mediterraneo Di Bari (IAMB), IT; FiBL Projekte GmbH, DE; FiBL Österreich, AT; FiBL Schweiz, CH; Ökologiai Mezőgazdasági Kutatóintézet (ÖMKI), HU; Con Marche Bio, IT; Estonian Organic Farming Foundation, EE; BioForum Vlaanderen, BE; Institut Technique de l'Agriculture Biologique, FR; SEGES, DK; Bioselena, Bulgaria

© 2017

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 652654. This communication only reflects the author's view. The Research Executive Agency is not responsible for any use that may be made of the information provided.

