

# Annual grasses in crop rotations with grass seed production

Peter Kryger Jensen, Aarhus University, Department of Integrated Pest Management,  
Forsoegsvej 1, DK-4200 Slagelse, Denmark,  
E-mail: Peterk.Jensen@agrsci.dk

## Abstract

In the article an overview of occurrence of important annual grasses as weeds in grass seed production is given. The article also gives the main conclusions concerning factors of importance in IPM strategies. These involve particular attention to the handling of volunteer seeds. In general seed survival is strongly reduced at the soil surface compared to incorporated seeds. Crop rotations and cropping systems that allow the volunteer seeds to be left as long as possible at the soil surface or in stubble favour a fast decrease of the soil seedbank of the investigated annual grasses.

## Introduction

In grass seed production purity of the product is of main importance. Many annual grasses are difficult or impossible to control chemically in grass seed crops and at the same time seed characteristics make it difficult to separate the seeds from some of the cultivated grasses. A main issue in an integrated strategy is to reduce or eliminate the seedbank of a species that possesses the above mentioned characteristics. Such strategies have been investigated and developed for some important annual grasses in Denmark such as *Apera spica-venti* (Jensen; 2009) and *Poa trivialis* and *Vulpia Myuros* (Jensen; 2010). However if volunteer seeds from a formerly grown species establishes in another grass seed crop a corresponding undesired contamination of the crop arises. Therefore correct handling of volunteer seeds of cultivated grass species is also important and has been investigated (Jensen; 2010). This paper and the presentation gives an overview of occurrence of important annual grasses in grass seed production in Denmark and it summarises the experiences obtained concerning non-chemical strategies to reduce pressure from annual grasses.

## Materials and methods

The conclusions on IPM strategies are a review of results obtained from different investigations during the last 15 years in different projects on non-chemical methods. The investigations have been published and the references are given.

The Danish area with production of grasses, clovers and other pasture legumes for seed production totals approximately 80.000 ha in average a year (Anon, 2009). During the growing season all fields are inspected and important weeds are assessed on a scale from 1-5,

Character	Weed abundance
1	A few plants in the field
2	Less than 1 per. 10 m <sup>2</sup>
3	1 – 2 per 10 m <sup>2</sup>
4	3 – 5 per 10 m <sup>2</sup>
5	> 5 per 10 m <sup>2</sup>

DLF-TRIFOLIUM has a market share of 80-90% and DLF-TRIFOLIUM has since 2004 stored all data from their field inspections in a database. This database has been at the disposal of a new project at the department of Integrated Pest Management. The database covers the period 2004-2009, and extracts from the database gives a survey of the most important weeds and especially annual grasses in Denmark.

## Results and discussion

### *Weed survey*

The field inspections of grass, clover and pasture legumes for seed production is carried out at a time where the weeds remaining in the field is a result of all preceding field operations influencing the weed in question. The field inspections therefore give a good impression of the actual weed problems related to the seed production of a certain species in Denmark at the time.

The most frequent grass weeds found in seed production was *Elytrigia repens*, *Poa annua*, *Poa trivialis*, and *Bromus hordeaceus*. *Vulpia* species is a special problem in fescue production and especially red fescue production. Among the cultivated grasses, *Lolium perenne* and *Dactylis glomerata* are most frequently found as weed infestations in fields with seed production of other grasses.

### *IPM methods*

IPM methods are important as chemical control options are limited or unavailable concerning many combinations of crops and weeds. The most important tools concerning annual grass weeds are:

1. Effective chemical control in the crop rotation where possible
2. Leave volunteer seeds at the soil surface as long as possible, this reduces longevity of both weedy and cultivated grasses and can be a very effective way to reduce the seedbank

3. The stale seedbed technique can be a very effective method to deplete the seedbank and reduce contamination of a subsequent grass seed crop
4. Spring establishment of seed crops reduces contamination with winter annual grasses.

An example of the influence of straw disposal technique and soil cultivation is shown in Figure 1.

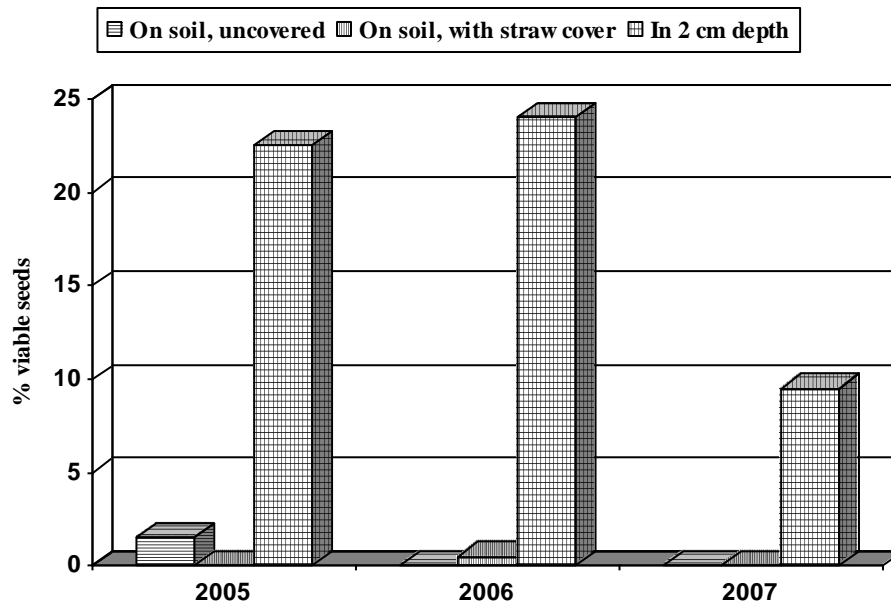


Figure 1. Longevity of seeds of *Poa trivialis* kept at the soil surface with or without straw cover or at a depth of 2 cm from maturity in July to the end of September the same year.

### Acknowledgments

Thanks are due to the Danish Seed Council and The Danish Food Industry Agency for financial support. Also thanks to DLF-TRIFOLIUM for giving disposal to their database and a special thanks to Bjarne Sorensen, DLF-TRIFOLIUM helping with data extraction from the database.

### References

- Anon. (2009). Rapport 2008 Brancheudvalget for frø. (Report 2008, Danish Seed Council) [http://www.seedcouncil.dk/getMedia.asp?mb\\_GUID=1AAB4A25-BB12-4F89-ADE9-FAD5650326F2.pdf](http://www.seedcouncil.dk/getMedia.asp?mb_GUID=1AAB4A25-BB12-4F89-ADE9-FAD5650326F2.pdf)
- Jensen, P. K. (2009) Longevity of seeds of four annual grasses and two dicotyledon weed species as related to placement in the soil and straw disposal technique. *Weed Research* **49**, 592-601.

Jensen, P. K. (2010) Longevity of seeds of *Poa trivialis* and *Vulpia myuros* as affected by simulated soil tillage practices and straw disposal technique. In print. Grass and Forage Science **65**, pp-pp..

Jensen, P. K. (2010) Longevity of seeds of *Poa pratensis* and *Lolium perenne* as affected by simulated soil tillage practices and its implications for contamination of herbage seed crops. In print. Grass and Forage Science **65**, pp-pp.