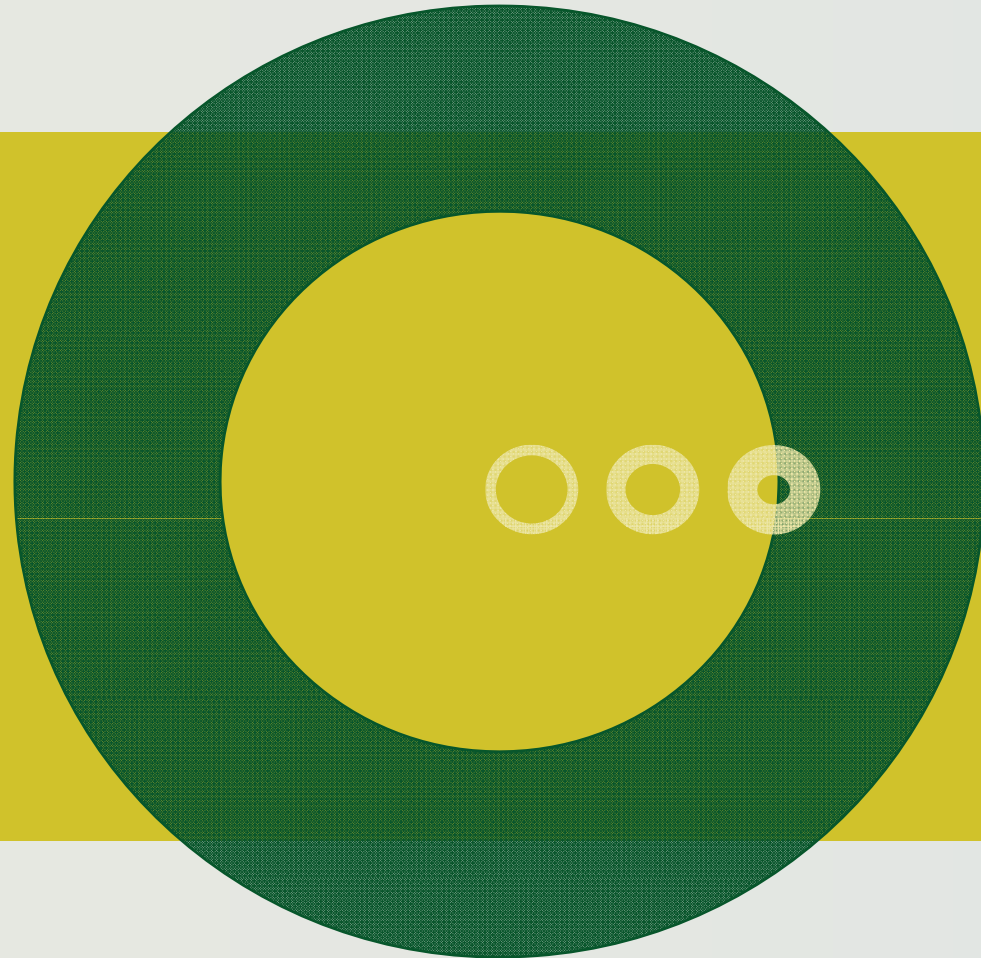




KNOWLEDGE CENTRE FOR AGRICULTURE

Cultivar mixture composition and its regulation for practice in Denmark

Morten Haastrup
Specialist, cereals
and industrial crops





Agenda

- The Danish cultivar testing system
- Regulation of cultivar mixtures
- Yield and potential of cultivar mixtures

What is the aim when mixing cultivars?

Wolfe (1985) defined cultivar mixtures as "mixtures of cultivars that vary for many characters including disease resistance, but have sufficient similarity to be grown together."



VCU in Denmark – the backbone

- Two parallel and integrated systems
- Statutory testing of value (STV) (Official trials) run by the Danish AgriFish Agency
- Voluntary annual testing of cultivars (National trials) run by farmers unions
- Database including cultivar codes, results etc. are shared between the 2 systems
- Both systems are paid by the breeders / representatives and via projects



The integrated VCU

Type of testing	Statutory VCU	Voluntary VCU	Obs. plots	ID-control
For listing, A	Yes	No	Yes	Yes
For listing and voluntary, A+	Yes	Yes	Yes	Yes
Voluntary B	No	Yes	Yes	Yes



Results from VCU and Obs. plots sets the framework for regulation of cultivar mixtures i Denmark



A cultivar mixture will only be approved if

- each cultivar represents the same percentage of the mixture
- it consists of 3 or 4 cultivars
- the cultivars in the mixture have had a relative yield $> 95\%$ in average of the last 5 years
($> 97\%$ if less than 5 years)
- there is no more than 5 days difference in ripening date
- there is no more than 15 cm's difference in straw length
- the average susceptibility to diseases is below a specified max



Susceptibility to diseases - example

	mildew	barley rust	scald	net blotch
Spring barley (2011)	< 6,1 %	< 7,7 %	< 0,5 %	< 1,5 %

The maximum is set each year by the Danish AgriFish Agency in collaboration with the Knowledge Centre.

Basis is the registered disease levels in the observation plots – average of the 5 most grown varieties.



Cultivar mixtures - how to apply

- Two times a year – one for spring sown cultivar mixtures and one for autumn sown cultivar mixtures
- Applications must be sent to The Danish AgriFish Agency



Anmodning om godkendelse af sortsblandinger af vårbyg

Virksomhedens navn: Adresse:

Ovennævnte sædekonsvirksomhed ønsker i sæsonen 2010/2011 at producere følgende
sortsblandinger af vårbyg:

Forslag til sortsblandinger	Sort 1	Sort 2	Sort 3	Sort 4	Mængde i tons
A	XA	XB	XC	XD	30
B	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
D	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
E	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
F	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
G	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
H	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
I	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
J	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
K	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Dato
Underskrift



Approval of cultivar mixtures

- If an applicant cultivar mixture meet the demands it will be approved instantly
- If an applicant cultivar mixture do not meet the demands it will be evaluated by the Danish AgriFish Agency (expert group) on the basis of properties identified by the applicant – e.g. resistance to epidemic diseases.
- In such cases the focus will be on differences in the resistance profile between the cultivars



Approved mixtures – 2010/2011

Crop	No. of batches	% of sold seed
Winter wheat	85	3,0
Winter barley	12	1,8
Winter rye	48	17,6
Spring barley	88	3,7



Approved mixtures – 2009/2010

Crop	No. of batches	% of sold seed
Winter wheat	144	4,7
Winter barley	0	0
Winter rye *	83	50
Spring barley	78	3,1

* Mixing of hybrids with conventional lines to avoid ergots



Example – spring barley trials

Spring barley	Relative yield						
	Sealand	Lolland-Falster	Bornholm	Eastern Jutland	Western Jutland	Northern Jutland	All of DK
<i>No. of trials</i>	2	3	1	3	3	2	14
Mixture ¹⁾	100	100	100	100	100	100	100
Quench	101	98	101	99	97	103	100
Rosalina	100	101	98	100	96	99	99
Cha cha	101	99	104	97	97	104	100
Anakin	101	101	101	99	99	104	101

¹⁾ Anakin, Cha Cha, Quench, Rosalina.

We are often criticized by breeders, because our reference mixture is making life too difficult for new cultivars

The Danish reference mixture in winter wheat did very well in the Swedish variety trials AND was banned !



The potential is

- a more stable yield
- a better resistance to diseases
- a better competition against weeds
- a crop that is less sensitive to stress (water, N, etc.)
- without compromising quality



Summary – regulation in Denmark

- VCU is a cooperation between official testing system, farmers unions, the universities and the breeders
- The VCU system is financed by breeders / representatives and via projects
- Results from VCU sets the criteria's for the regulation of cultivar mixtures in DK
- Simple and effective system
- Cultivar mixtures are NOT used progressively at the moment
- There is a potential for more mixtures
- Maybe IPM or organic farming will pave the way ?

Thank you for your attention

