Ny sygdom i engrapgræs

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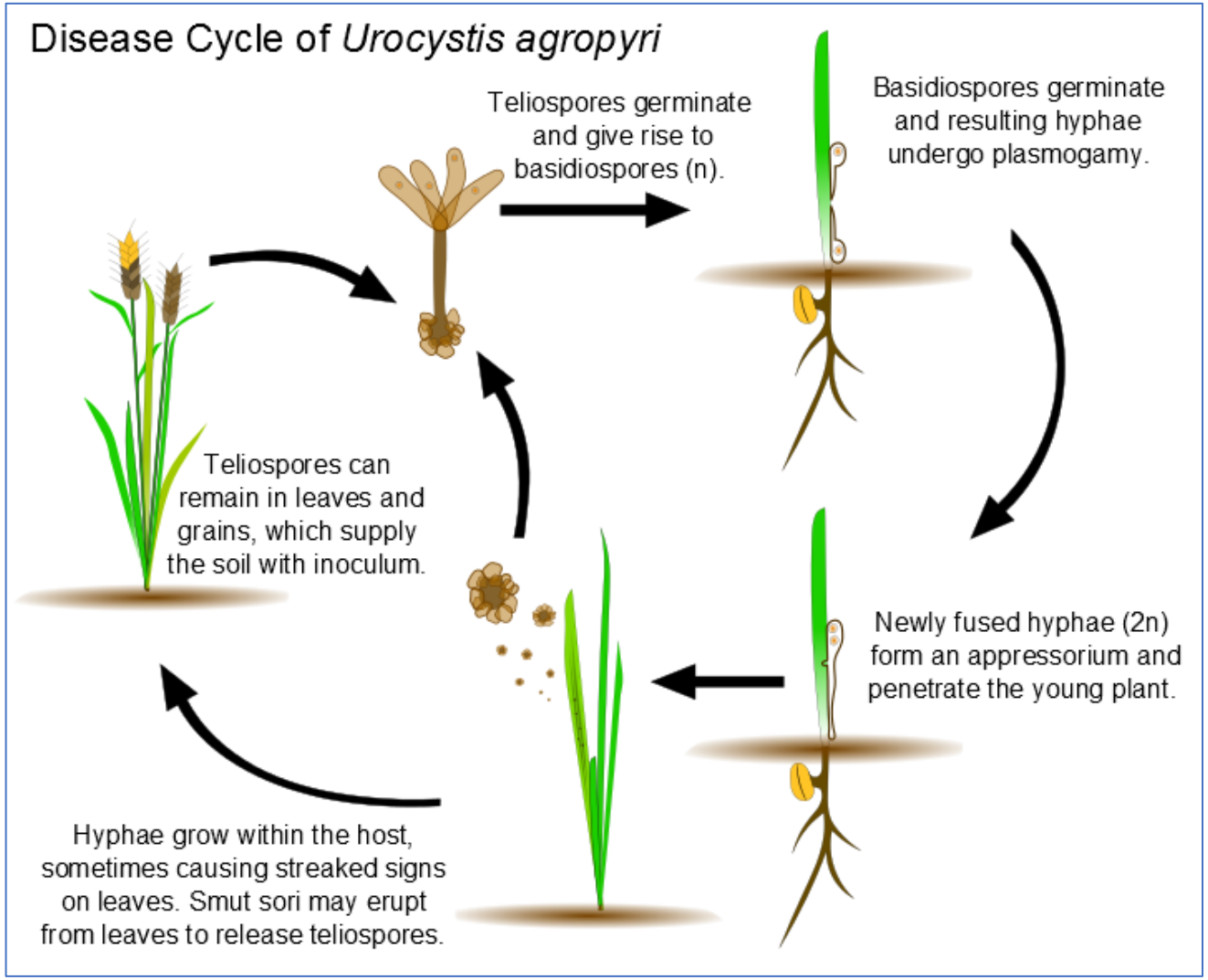
Billeder fra Ballin marken på Stevns.

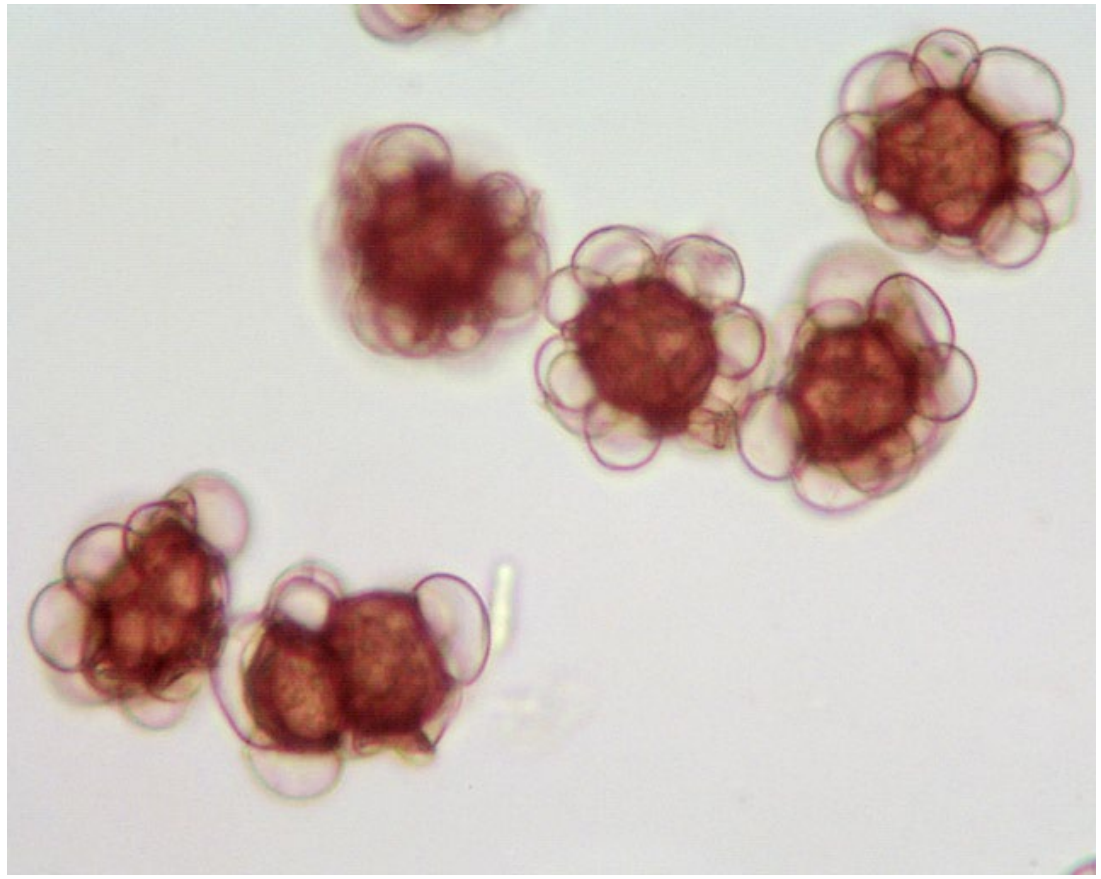
Urocystis agropyri hos engrapgræs

46. Stripe smut of *Poa pratensis*. (Courtesy P. M. Halisky)

Foto: Carina Van Steenwinkel



Sporer af *Urocystis agropyri*



These spores are reddish brown, smoothly rounded, and they tend to be in clumps of 5-6 with sterile cells around them. The clumped spores are often referred to as "spore balls" and measure about 20-50 microns. Large quantities of *U. agropyri* spores look like brown or black dust.
Pictures from APS Compendium of turf grass diseases (R.W. Smiley)

DNA oprensning af spore og analyse viste på linie med spore bestemmelsen, at der var tale om *Urocystis agropyri*

Front Plant Sci. 2020; 11: 1039.

To detect *U. agropyri*, species specific primers were developed by comparing the partial sequences of internal transcribed spacer (ITS) DNA region of *U. agropyri* with related and unrelated phytopathogenic fungi. The clear amplicons of 503 and 548 bp were obtained with the two sets of designed primers (UA-17F/UA-519R and UA-15F/UA-562R) from the genomic DNA of 50 geographic distinct isolates of *U. agropyri*.

The presence of *U. agropyri* in all the soil samples collected from an infected field and plant tissue of diseased plants collected at two different stages (20 and 40 days post sowing) and the absence in the soils and plants of healthy plots indicated 100% reliability for detection of *U. agropyri*. This simple and rapid test can be employed for the detection of *U. agropyri* from enormous wheat and soil samples in very short time with less man power.

Udbredelse registreret i flere arter

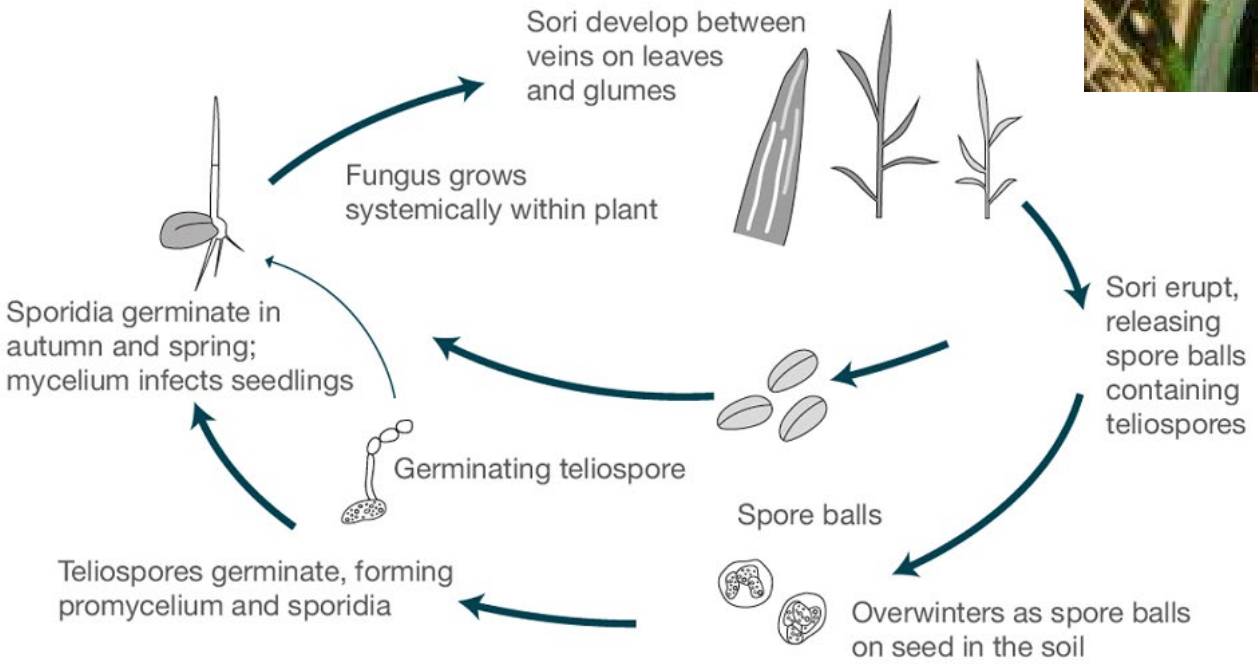
(Kilde : APS, Compendium of turf grass diseases)

TABLE 2. Leaf Smut Fungi on Turfgrass Genera

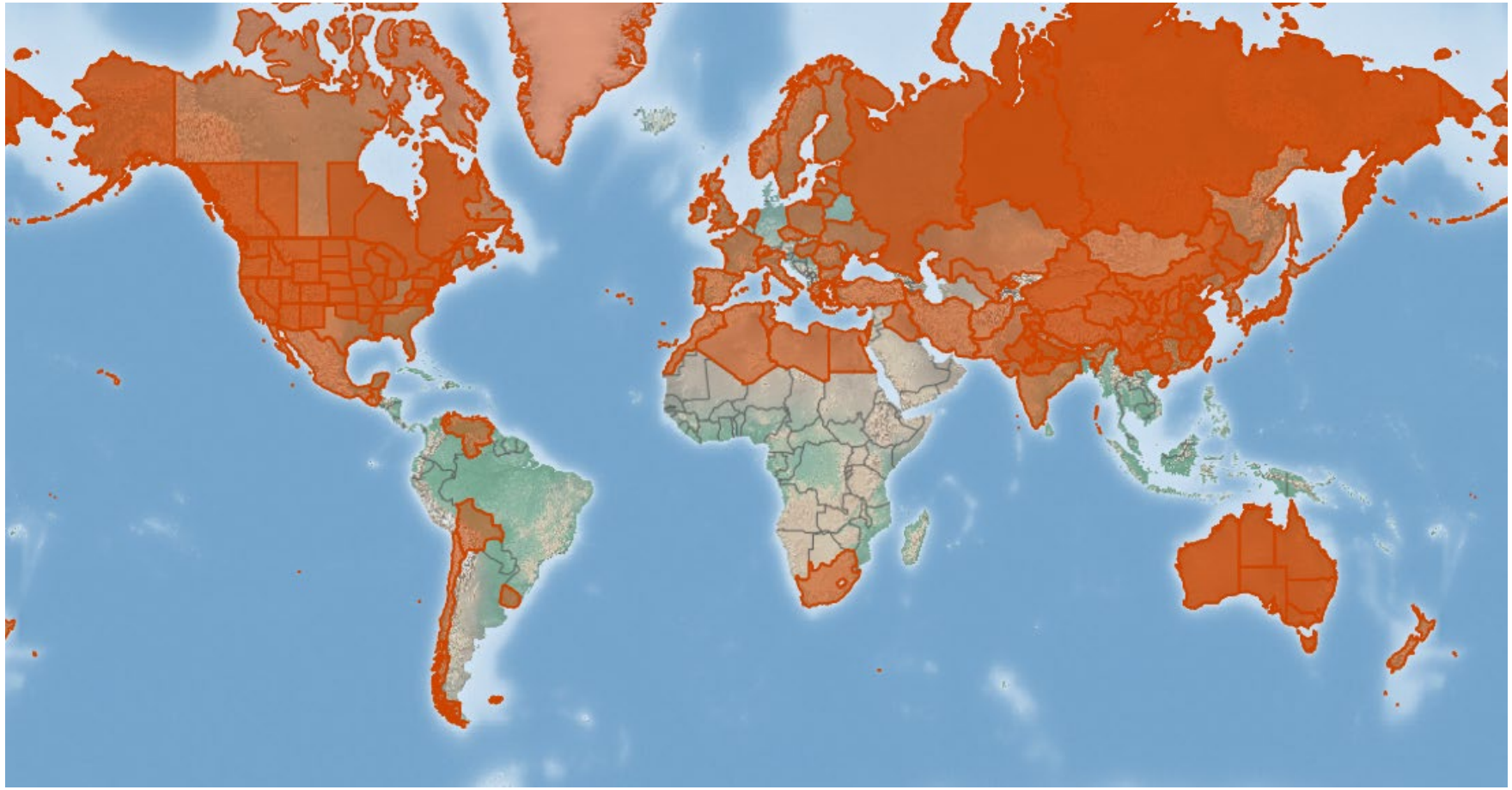
Smut Fungi	Host Genera	Distribution
Entyloma		
brefeldi Krieger	*Agropyron*	Europe
camusianum P. Hariot	*Phleum, Poa*	Europe, Asia
crepinianum Sacc. & Roumequere	*Poa*	Europe
dactylidis (Pass.) Cif.	*Agrostis, Festuca, Phleum, Poa*	Worldwide
lagerheimianum Liro	*Festuca*	Europe
poae Liro	*Poa*	Europe
spragueanum Zundel	*Poa*	North America
Urocystis		
agropyri (G. Preuss) Schröt.	*Agropyron, Agrostis, Festuca, Phleum, Poa*	Worldwide
agrostidis (Lavrov) Zundel	*Agrostis*	Asia
bolivari Bubak & Fragoso	*Lolium*	Europe
macrospora (Desmaz.) Liro	*Festuca*	Northern Hemisphere
occulta (Wallr.) Rabenh. ex Fuckel	*Festuca*	Worldwide
Ustilago		
agropyrina Lavrov	*Agropyron*	Europe, Asia
buchloes Ellis & Tracy	*Buchloe*	North America
calamogrostidis (Fuckel) G. P. Clinton	*Agropyron*	Northern Hemisphere
liroe Zundel	*Agropyron*	Europe
macrospora Desmaz.	*Agropyron*	Worldwide
spegazzinii Hirshhorn	*Agropyron, Phleum, Poa*	Worldwide
striiformis (Westend.) Niessl	*Agropyron, Agrostis, Festuca, Lolium, Phleum, Poa*	Worldwide
trebouxi H.&P. Sydow	*Agropyron*	Northern Hemisphere
Tilletia		
sterilis Ule	*Festuca*	Europe

Relatives of *U. agropyri* infect other grasses and are frequently identified as the causal organism of flag smut on wheat, but there is debate still as to whether they are the same organism or different strains.

Urocystis i hvede



Udbredelse registreret af *Urocystis agropyri* (Kilde: CABI)



Lidt om dens epidemi – meget er kendt fra hvede-

som også kan angribes – men som ikke er set i DK.

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- Etableres tit i nye skud –coleoptiler og gror efterfølgende systemisk Takahashi and Iwata (1964), .
- Symptomerne ses ofte først som hvide striber, og disse skifter senere til grå og sorte striber med indhold af spore-bolde. Takahashi and Iwata (1964),
- Inficerede planter kan overleve, men vil forblive inficerede

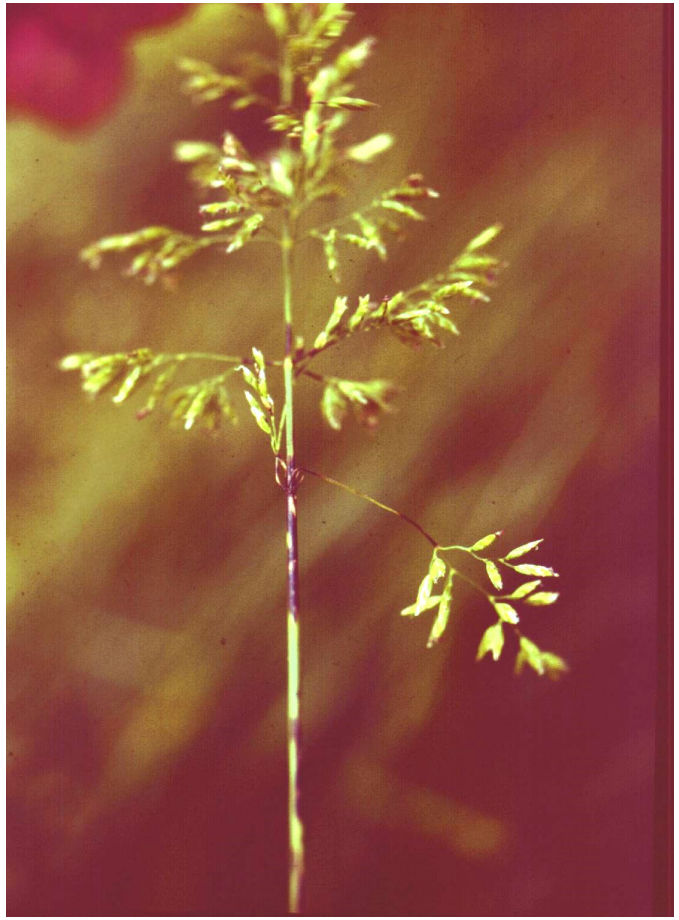
Lidt om dens epidemi – meget er kendt fra hvede- som også kan angribes – men som ikke er set i DK.

- Ses ofte først flere år efter at de første planter er inficeret
  - Turf grass ses ofte først med angreb efter 3-5 år
  - Under forhold med nok vand ser angrebne planter ofte fine ud
  - Ved tørke og stress – fremkommer tydelige tegn på misvækst.
- Et andet symptom på angrebne græsplanter er fund af tynde og hæmmede planter, hvor der senere vil udvikles spore (Thirumalachar and Dickson, 1949).
- Inficerede planter kan udvikle deforme eller manglende blomsterstande
- Sygdommen kan overleve passage gennem dyremaver (McAlpine, 1910).

Formodet problemstilling

- Størst problem i flere års marker – hvor smitten kan bygge op!
- Ingen kemiske løsninger i frø (bejdsning virker i hvede)
- Jordsmitte – betyder, at man skal sikre godt sædskifte
- Frøsmitte – ikke godt i et græsfrøparti!
- Kendt som karantæne skadegørere i hvede
- Testmetoder?

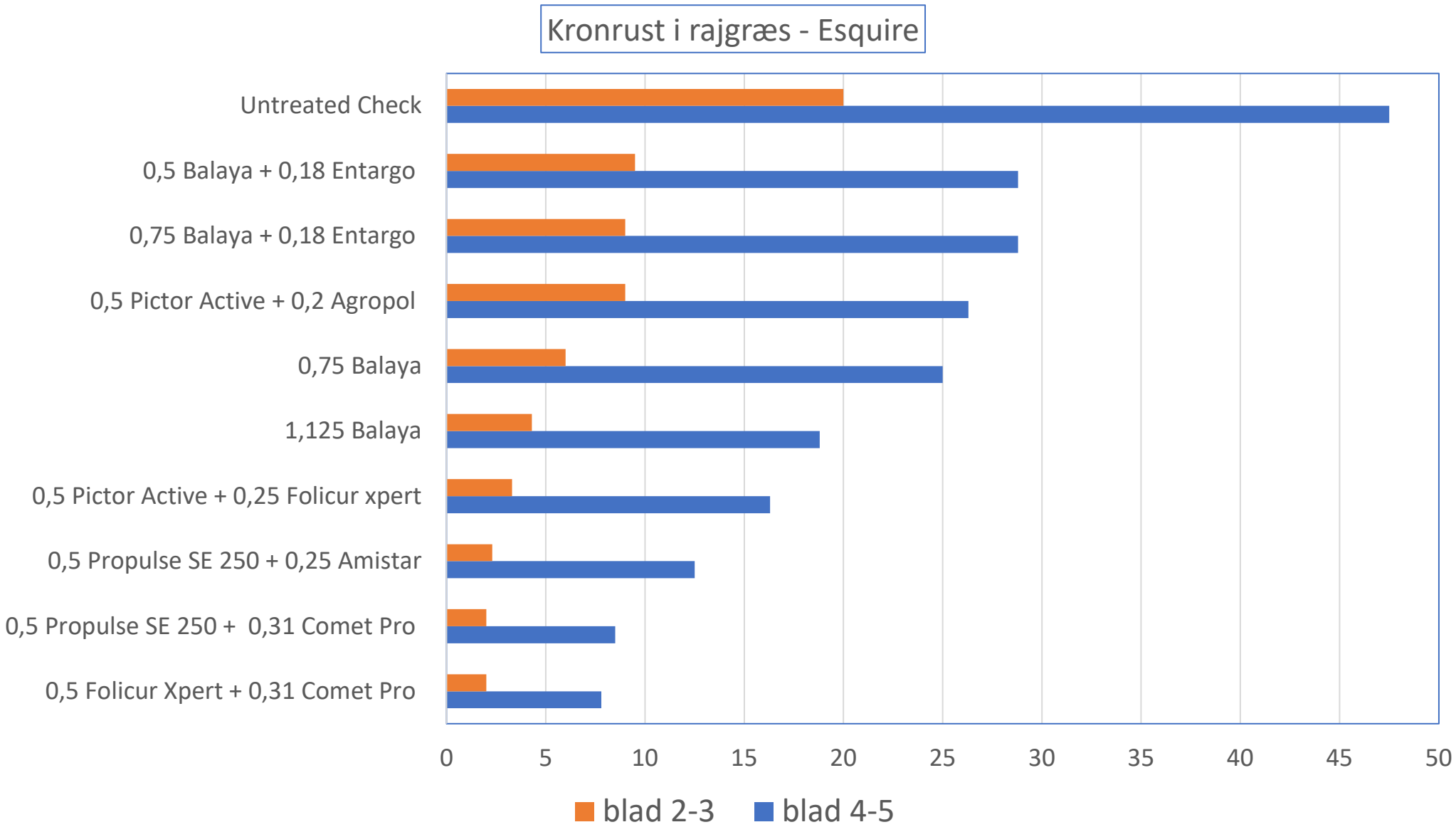
Rød øjeplet i engrapgræs



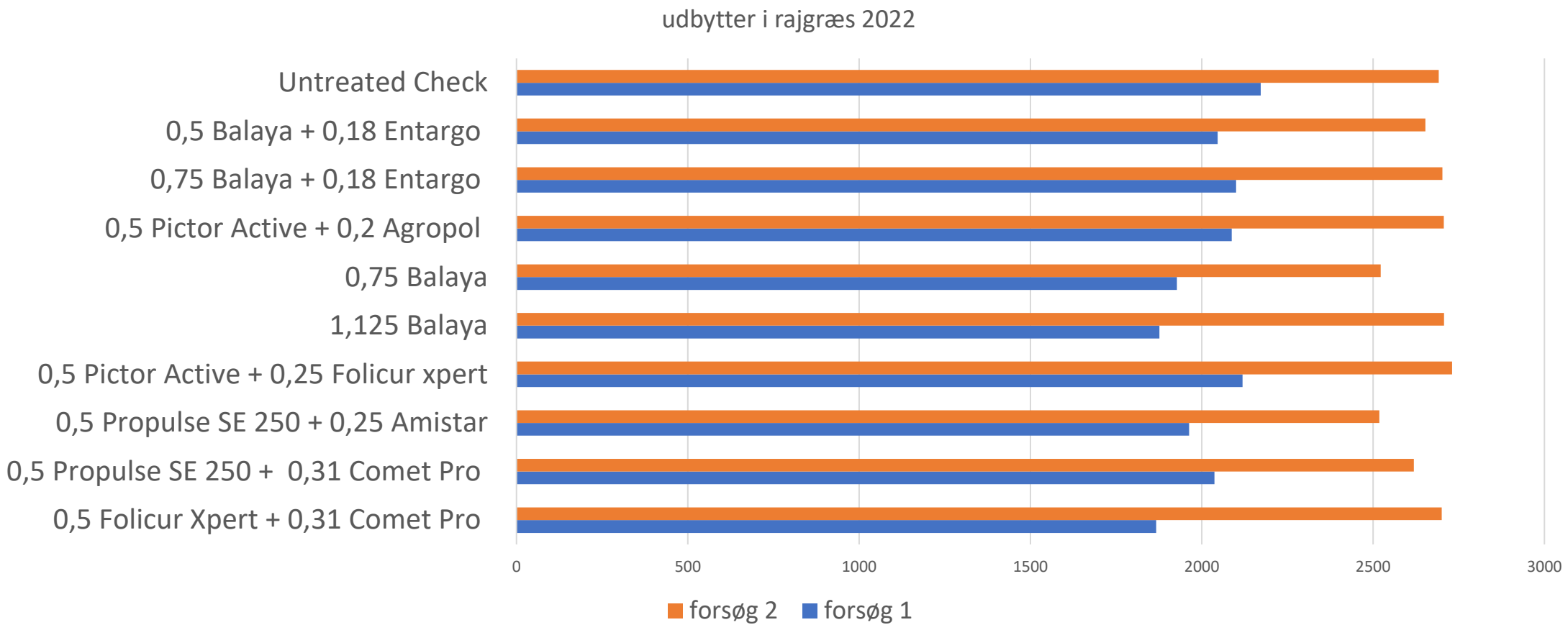
Resultater fra afprøvningsforsøg 2022 i rajgræs Bekæmpelse tidpunkt vs 37-51

Propulse

ubehandlet


Kronrust i rajgræs - Esquire
Untreated Check
0,5 Balaya + 0,18 Entargo
0,75 Balaya + 0,18 Entargo
0,5 Pictor Active + 0,2 Agropol
0,75 Balaya
1,125 Balaya
0,5 Pictor Active + 0,25 Folicur xpert
0,5 Propulse SE 250 + 0,25 Amistar
0,5 Propulse SE 250 + 0,31 Comet Pro
0,5 Folicur Xpert + 0,31 Comet Pro
0
5
10
15
20
25
30
35
40
45
50
blad 2-3
blad 4-5

Resultater fra 2 rajgræsforsøg
Ingen sikker forskel mellem behandlinger



Fungicider tilladt til sygdomsbekæmpelse i frøgræs 2023

	Normal dosis	Sortrust og brunrust	kronrust	Bladpletter Drechslera spp.	Meldug
Amistar /Mirador	0,5	**	*	***	*1)
Comet pro	1,25	**	**	***	*1)
Orius Gold	0,412 - 0,6	***	***	***	**(*)
Folicur xpert EC250	0,5	***	***	***	**(*)
Talius	0,25	-	-	-	***
Balaya *	1,0 - 1,5	**(*)	**(*)	***	**1)
Entargo*	0,35 - 0,7	-	-	*(*)	-
Pictor active *	1,0	**	**	***	*1)
Propulse **	1,0	***?	***	***	***

- * Mindre anvendelse
- ** ikke godkendt
- 1) risiko for strobilurin resistens
- 2) ikke tilladt

Mulige løsninger – udgangsdoseringer
Som kan reduceres afhængig af 1 eller 2 sprøjtninger

	Dosering 50:50	
Folicur Xpert + Comet pro	0,5 + 0,624	100%
Balaya + Entargo	0,75 + 0,35	100%
Orius Gold + Comet pro	0,4-0,6 + 0,624	100%
Folicur Xpert + Comet Pro + Entargo	0,5+0,31+0,18	100%
Propulse + Comet Pro	0,5 + 0,624	100%
Pictor active + Folicur Xpert/Orius gold	0,5 + 0,5/0,4-0.6	100%

Mulige løsninger fordelt på virkningsgrupper og pris

Ved samlet 100% (50:50)	Azoler	Strobilurin	SDHI
Bell + Comet Pro (pris)	40%	50%	50%
Folicur xpert + Comet pro 133 + 203 = 336 kr	120 g (52%)*	125 (50%)	-
Balaya + Entargo 356+ 149 = 505 kr	75 g (50%)	75 g (30%)	175 g (50%)
Orius Gold + Comet pro 104+203= 307 kr	125 g (50%)*	125 (50%)	-
Folicur expert + Comet Pro + Entargo 133+102+77= 312 kr	120 g (52%)*	62 g (25%)	90 g (26%)
Propulse + Comet Pro 178+203= 381 kr	62,5 g (31 %)	125 (50%)	63 g (50%)
Pictor active + Folicur xpert/Orius gold 190+133= 323 kr	120/125* (50%)*	125 (50%)	75 g (21%)

* Begrænsninger i anvendelsen pga af azol regler.

Urocystis i hvede (AHDB)

- *How serious is flag smut disease in UK wheat?*
- The disease tends to be more problematic in areas with arid summers and mild winters. It was not known in the UK until 1998, when an outbreak was confirmed in Essex.
- Autumn-sown wheat is relatively vulnerable. However, the disease is not particularly damaging, unless present at high levels. Despite this, it can have serious consequences for exported grain or wheat products. Many countries have quarantine restrictions that prohibit the import of wheat products from countries in which the disease is established.

- *Life cycle and symptoms*
- The pathogen (*Urocystis agropyri*) infects wheat and many grass species. However, the strain(s) that affect wheat are specific to this crop.
- When contaminated grain is sown, or if healthy grain is sown into contaminated soil, teliospores germinate.
- These produce a secondary spore type (sporidia) that penetrates and infects the coleoptiles of germinating wheat.
- The fungus grows inside the plant.
- Affected plants are severely stunted.
- Excessive tillering is common and often the ears fail to emerge, remaining within the boot.
- Late in the season, typical striping symptoms show on the upper leaves – long, dark grey to black streaks on the leaf blades and leaf sheaths.
- The streaks eventually erupt, giving the leaves a ragged appearance and exposing the black teliospores.
- These teliospores are then dispersed, making plants look as though they are covered in soot.
- The teliospores can either be blown onto grain of healthy plants, contaminating the grain, or they can drop to the soil where they survive for up to four years.

Urocysitis agropyri i hvede.

- *Urocystis agropyri* is a global problem in wheat-growing regions, especially where environmental conditions suit the fungus.
- Flag smut was first reported from *Agropyron* spp. in Europe in 1848, misattributed to *Uredo agropyri*.[1]:48 It was probably present in South Australia before 1868, known as "black rust", but is only definitely identified starting from that year.[6] It was at first identified by Wolff 1873 as *U. occulta*, but spore morphology differentiated it in the opinion of Körnicke 1877.[1]:48
- Later, other countries identified it as the pathogen that was introduced to world crops through trading of seeds and infected cultivars. The development of flag smut in Australia in the nineteenth century, followed by the United States in the twentieth century, is likely due to the spread and exchange of contaminated seeds.[13][14]
- Quarantine regulations restricted the movement of infected seed, chaff, and farm machinery from endemic areas. They were first enacted in the USA in the twentieth century to effectively inhibit the spread of disease. Similar regulations were later adopted in Belgium, Germany, the Netherlands, the United Kingdom and many other countries.
- Flag smut is widespread across Australia and was particularly problematic in the 1920s until resistant cultivars were discovered and put into use.[4] Between 1955 and 1971, flag smut damage and distribution increased in the Pacific Northwest of the United States when the use of several susceptible wheat cultivars was coupled with deep seeding in early autumn planting.[3] Through use of resistant cultivars, the Pacific Northwest's flag smut issue no longer poses a significant threat to yields.

Litteratur

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