

*Policy and practice
within the adaption to
general environmental rules
in greenhouse productions*

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Headlines

- ▶ General background
- ▶ Statistics greenhouses
- ▶ Environmental and pesticide regulations
- ▶ Pesticid analysis in small streams
- ▶ Challenges and professional advice
- ▶ Subsidiery schremes
- ▶ Future perspectives

Short background intro



Pesticider i 2020

Everenden

Anthraquinon (fund ikke taget med) (naturligt stof)
Boscalid (Signum friland og væksthuse)
Carbendazim (tidligere pryddplanter i væksthuse)
DEET (myggemiddel)
DMST (nedbrydning af Europharen (friland))
Desethyl-terbuthylazin (Pestanal ukrudtmiddel ej godkendt)
Diflufenican (DFF ukrudtmiddel friland)
Flonicamid (Teppeki)
Imidacloprid (Warrant/Confidor)
MCPA (Ukrudtmiddel)
Pirimicarb (Perimor friland)
Thiacloprid (Biscaya friland)
Azoxystrobin-metabolit (svampemiddel)

Vibækrenden

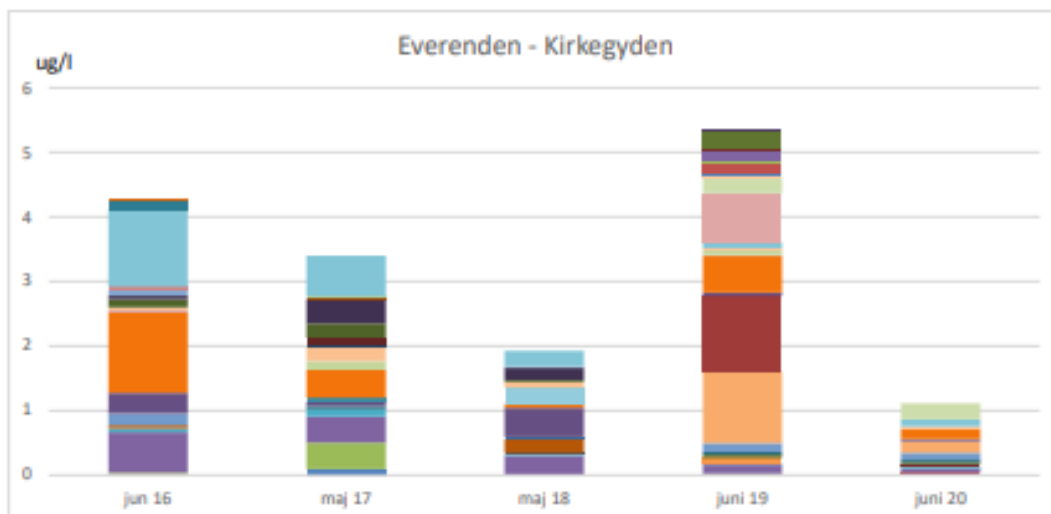
Azoxystrobin (Amistar også væksthuse)
Boscalid (Signum friland og væksthuse)

DEET (myggemiddel)
DMST (nedbrydning af Europharen (friland))
Fluroxypyr (ukrudt frøgræs)

Thiacloprid (Biscaya friland)

**Wet deposition from
out side air?**

Novana report from 2018



National guidance document



Overview of:

- General environmental regulation
- Pesticide regulation

Tasks that is answered in the guidance:

- Open/closed buildings
- How should pesticides be approved
- What is done with plant waste and waste water?

National guidance document - Challenges

- Pesticides are according to EU regulation 1107/2009 approved only for the use in closed buildings
- Greenhouses are not closed – maybe 10%!
- Pesticides for open greenhouses must be reapproved
- Discharge of all water and plant waste is only allowed outside greenhouses with permission!

Closed/open greenhouses?

Closed greenhouses

- Recycling of irrigation water
- Collection of condensated water from glasses via gutters
- Sealed benches or
- Sealed floors made of concrete, membranes or two layers of plastic
- Waste of plantmaterials must be collected in closed containers

NO leaching or leaking of pesticides may occure!

Plant waste storage and disposal?

Storage :

In closed container if pesticides approved for closed greenhouses were used

Disposal:

Burning if pesticides approved for closed greenhouses were used

Spreading in arable land if acknowledged with local community



Statistics- closed/open

- Today 5-10 % is closed production area
- Old (>20 years) productions are difficult to close

Age Year	Area 1000m2	*Can be closed %
>20	2.723	10%
10-19	1.026	50%
0-9	659	100%

DK Stat 2011

* Estimated by greenhouse builder (Drivadan 2019)

Recirculation, greenhouse

Number	m ² total	m ² with recirculation
41	961.067	878.087

91 % of the area is recirculated

Statistic from visit in 41 greenhouse nurseries, 2015

Main challenges in the greenhouses

- ▶ Many old benches, especially roller benches,
 - ▶ Has to be sealed or changed.
- ▶ Mismatch between watersystem and size of draintank, buffertank etc.
 - ▶ May need investment in new systems, but some can solve it, just by changing strategi
- ▶ Condensation water is mixed with rainwater, or no condensation gutter at all.
 - ▶ Different solutions depending on the construction of the greenhouse



Limning af planteborde i plastik og aluminium

Adheseal og Spray Seal HS
(Sprøjte sealer), er en enestående MS polymer-baseret lime der bevarer sin elasticitet, er velegnet til limning af planteborde af bl.a. plastik og aluminium.

Benyttes sammen med Innotec Foundation Tape, og Innotec Unisol (afrensning).
Yderst miljøvenlige og lette at håndtere.
Produkterne tørrer ikke ud i hverken pistol eller tube.
Kontakt os, for nærmere spørgsmål.

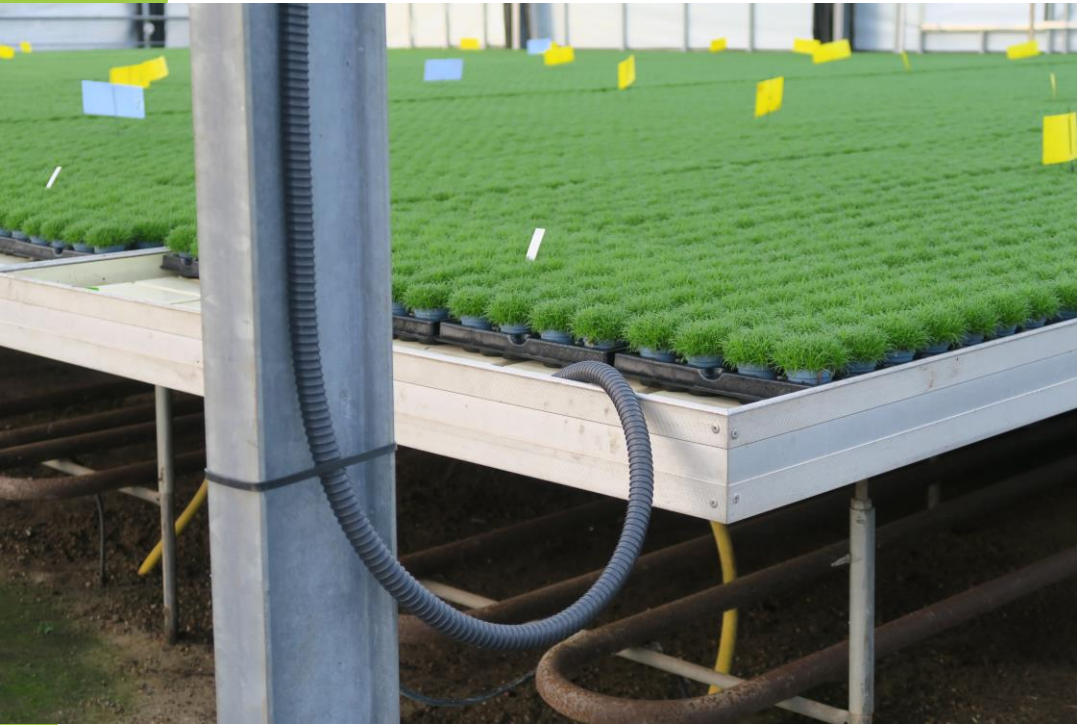
Kontor/Lager: 86 28 63 36
Fyn: Daniel Loberg 60 16 49 47
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Jylland Syd: Henrik Schønning 29 12 50 33
Jylland Nord: Jens Jensen 60 48 27 34

INNOTEC
ONLY QUALITY HAS A FUTURE



Condensation gutters





Pesticide regulation - now and future

NOW

Pesticide regulation 1107/2009:

‘greenhouse’ means a walk-in, static, closed place of crop production with a usually translucent outer shell, which allows controlled exchange of material and energy with the surroundings and prevents release of plant protection products into the environment.

FUTURE

If productions are OPEN, we must apply for OPEN productions

Conditioned approvals

Spraying technic

We are investigating the influence of spraying technic on the amount of pesticides in condensation water



Trials spraying technic

TEMA - Det lukkede væksthuis

Ny sprøjteteknik kan ændre afsætningen på glasset

Lavt sprøjtetryk og grove dråber kan sandsynligvis hindre afsætning af sprøjtevæske på indersiden af taget i væksthuis. Et ændret bevægelsesmønster kan måske sikre en ensartet fordeling af væsken

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90 procent. Disse dyser laver en meget lille andel af fine dråber, som er dem, der via luften passivt kan ledes til uønskede

Sprøjtning ved 3, 20 og 40 bar er alle udført med kort griffel, og det betyder at man skal ind mellem hvert andet eller hvert tredje bord for at gennemføre sprøjtningerne. Til gengæld opnår man en meget mere ensartet sprøjtning end ved sprøjtning ved 60 bar, hvor alt blev sprøjtet ude fra midtergangen. Sprøjtning fra midtergangen vil altid resultere i større variation i afsætning af sprøjtevæske på planterne samt i større afsætning på vægge, inventar og loft.

Vandfølsomt papir og en app

Ved hver sprøjtning blev der opsat vandfølsomt papir 1,5 meter over bordet seks steder hen over bordet. I de tilfælde, hvor der man kunne se en afsætning af væske på det vandfølsomme papir,

Trials spraying technic

High pressure spray equipment, 60 bar

The water sensitive paper is placed 1,5 m over the benches.



Trials spraying technic

High pressure with drift reducing nozzles, 40 bar

Still a few drops 1,5 meter over the benches



Trials spraying technic



Low pressure spray equipment, 3 bar, no deposit 1,5 meter over the benches

Wastewater regulations and challenges

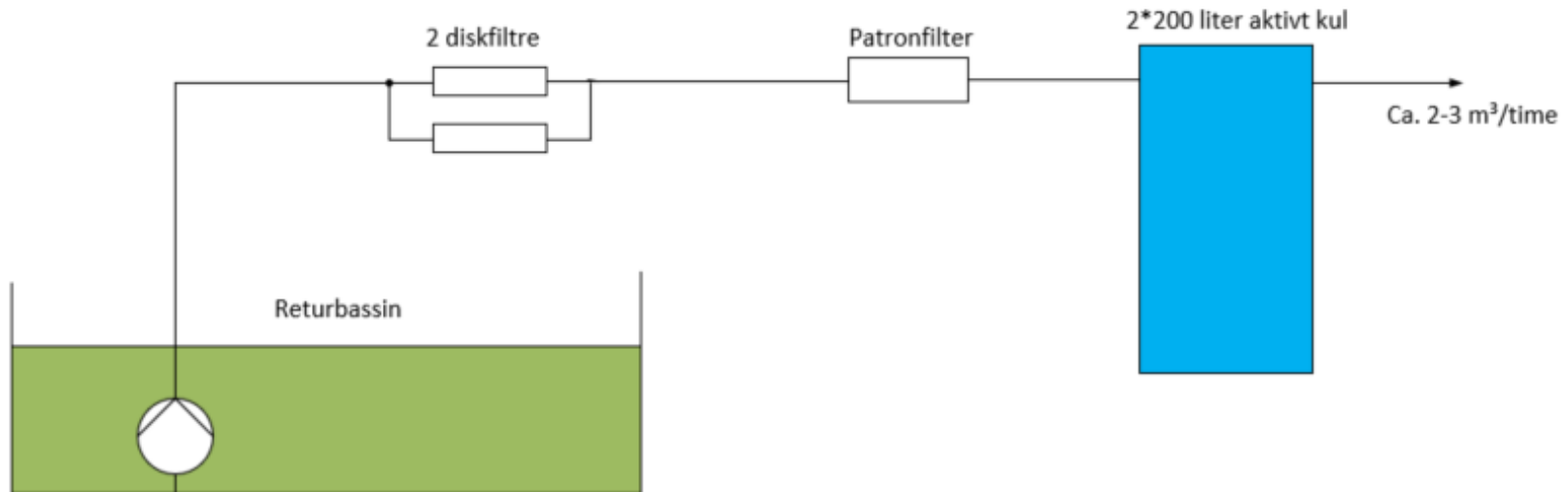
- General environmental regulations (Miljøbeskyttelsesloven §19)
- Discharge of any water in the environment need a permit
 - Which active ingredients is in the waste water?
 - How much water?
 - Where is the water discharged?
- Lack of limited values of important active substances makes it very difficult to get a permit
- Purification of water is possible



Wastewater regulations and challenges

FØR
Fungazil, Imazalil 2.100 µg/liter
Amistar, Azoxystrobin 1.700 µg/liter
Teppeki, Flonicamid 2.000 µg/liter

EFTER
Screenede pesticider 0 µg/liter

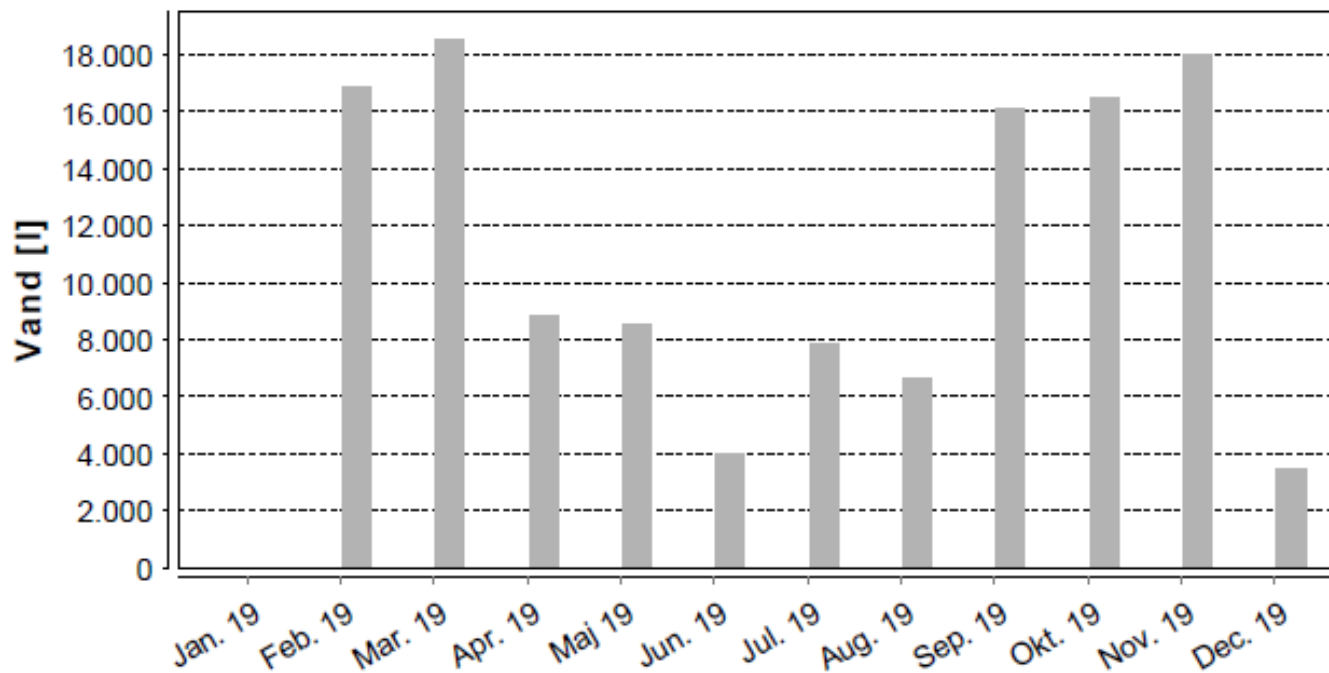


Wastewater regulations and challenges



Wastewater regulations and challenges

Liter condensation water collected from a
"dutch" greenhouse 4.320 m²



Professional advice

List with important check points

Follow up visits

Pesticide check

Productionplanning - changing cultivar.

Pesticide check



Production planning

PGR´s is a problem in open greenhouses.

HortiAdvice makes trials with alternative growth regulation methods

Changing variety or even cultivar



Subsidary schemes



Future perspectives

- Old greenhouse productions will end before planned
- Is it possible to fight important pests and diseases?
- Competitiveness can be challenged

Questions

