Sheep breeding in The Netherlands

NOVEMBER 15, 2019

SHEEP BREEDERS ROUND TABLE

REINARD EVERTS - NSFO

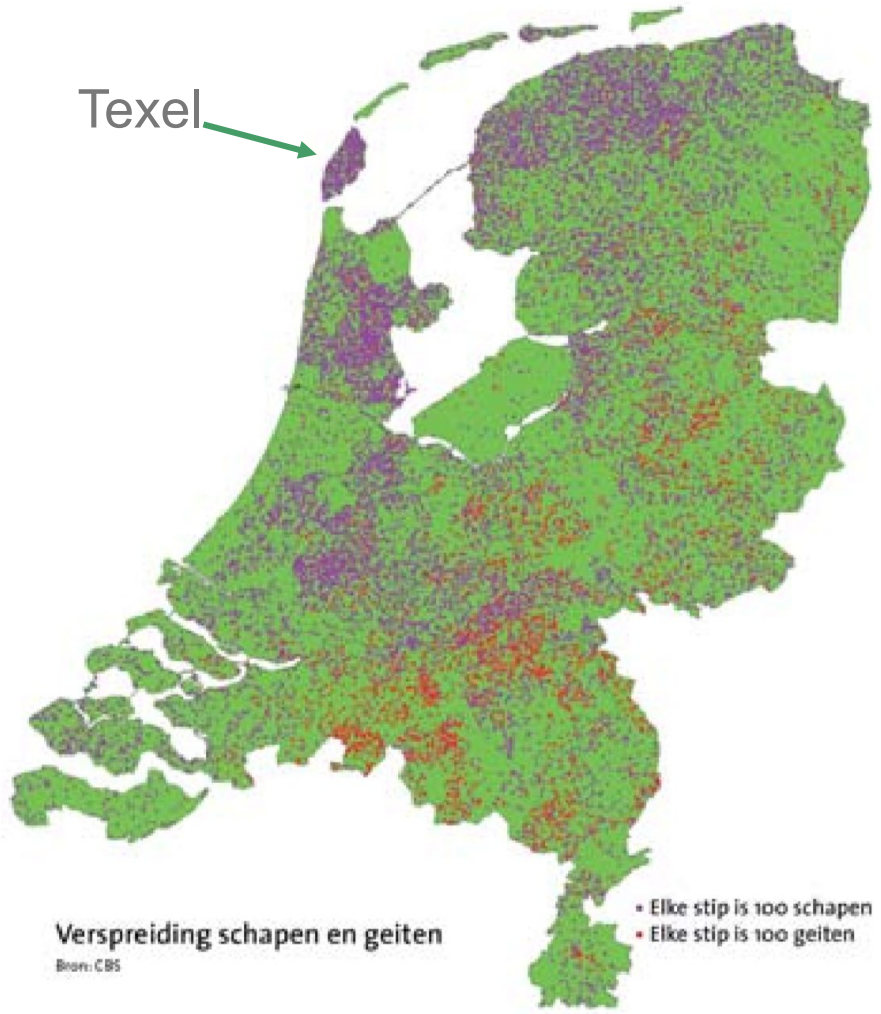
Who am I?

About NSFO – established 2002

- 7 breeds - 790 breeders
- Private Association – flockbooks are members
  - No subsidies or state aid
- Own online database (NSFO Online)
- EBVs, flockbook records, exterior examinations, ultrasound scanning
- Animal health schemes for Maedi Visna/CAE and CLA
- First predecessor founded in 1909

The Dutch Sheep Sector

- 900.000 sheep – all with EID
- 30.000 flocks
  - 20.000 with 1-5 animals
  - All animals are in central I&R database
- Texel breed largest breed
  - In my presentation I will mainly focus on this breed for examples



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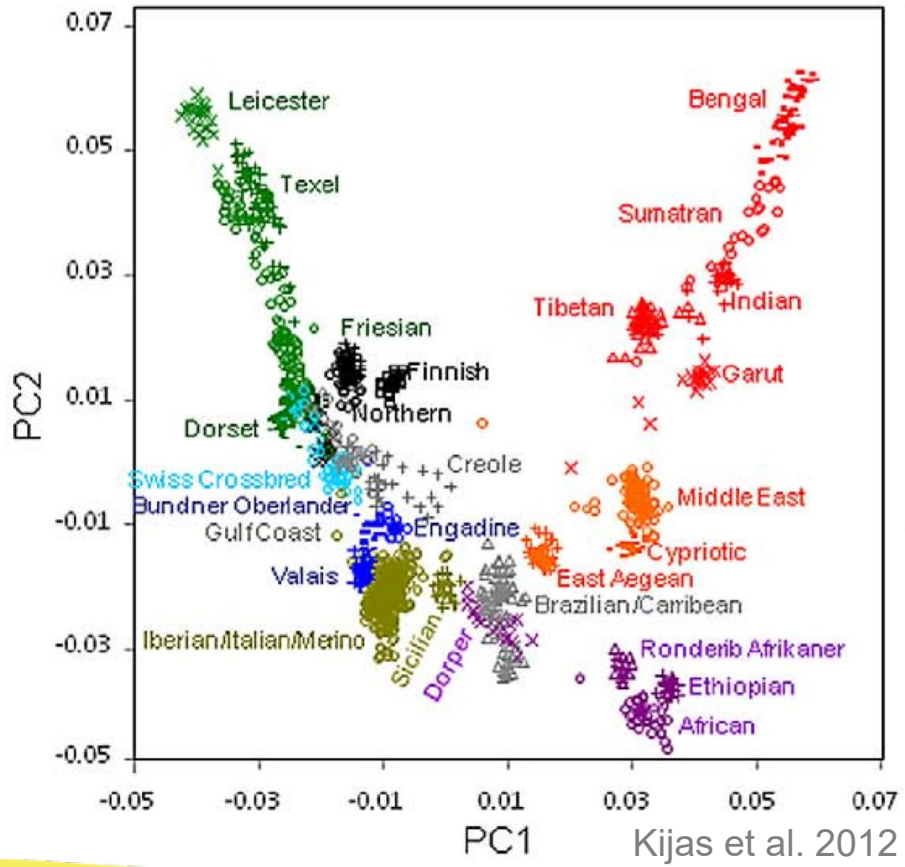
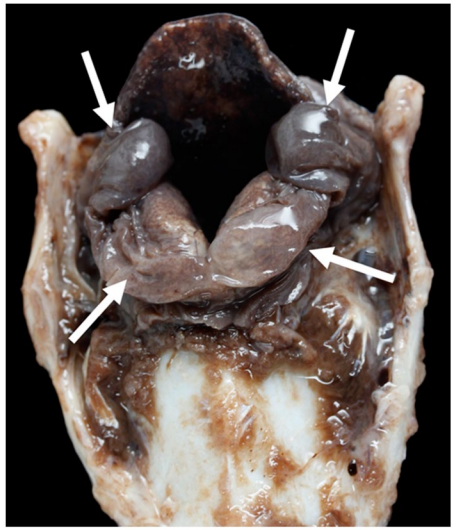
Yes, we are proud of ‘our’ Texel breed



Kijas et al. 2012



Waine et al. 2019

YES this is malformation and
NO we don’t like this anymore

Where did we breed her front?

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Outline of this presentation

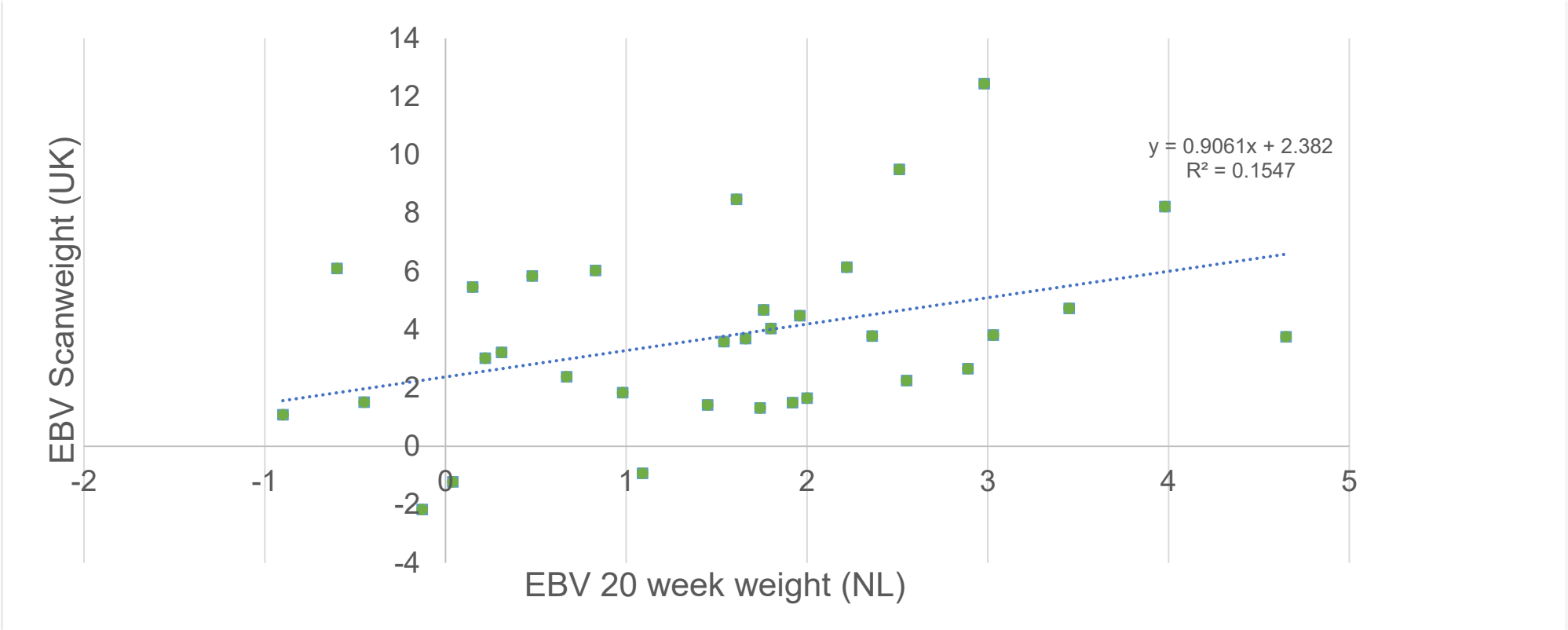
- Dutch EBVs
- Progress in Dutch Texel Sheep
- Breeding for worm resistance (salival IgA)
- Some results of recent research projects

Dutch EBVs

- Every year base is corrected
  - Average for animals born 5 year earlier is set to 0 / 100
- EBVs for all breeds are calculated at once
- Last major revisions in 2017
- 18 EBVs for fecundity, growth, length of tail, exterior characteristics, wormresistance etc.

NL and UK EBV scanweight (20 week)

(based on 34 imported UK Texels)



EBVs for exterior characteristics (how does the animal perform at 1.5 years age)

Head
Type

Muscularity
Upgrowth

Proportionaly
Legs

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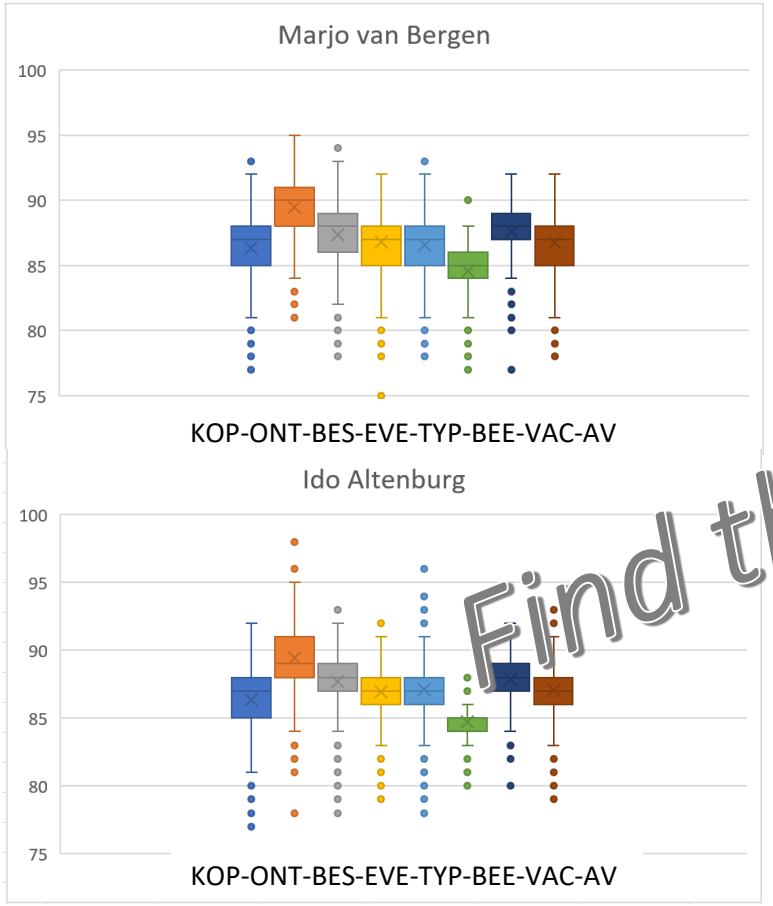
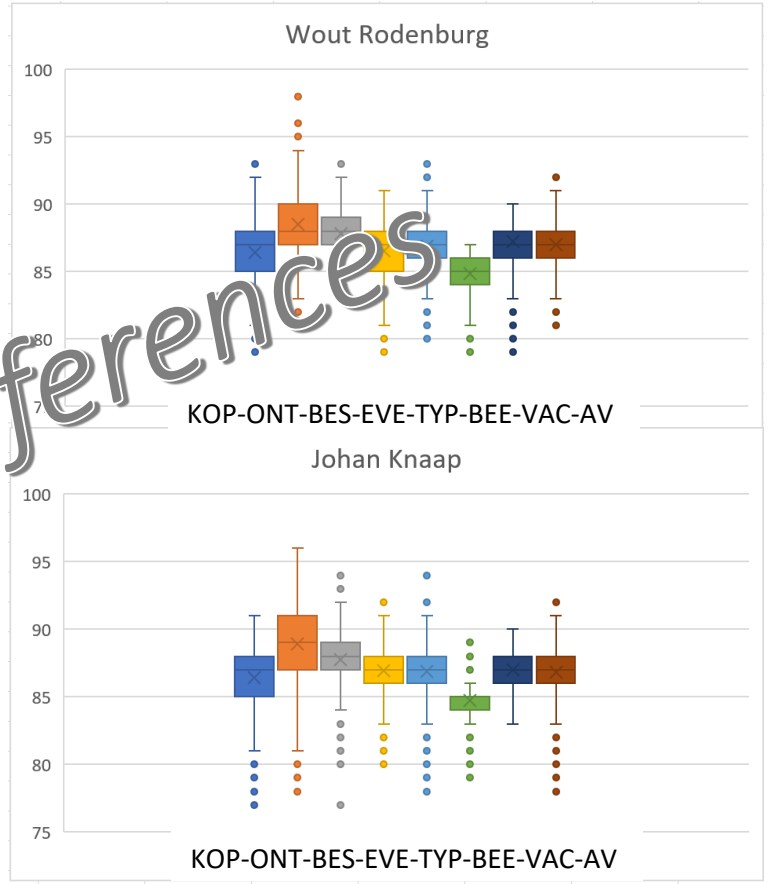
EBVs exterior
Show animals not always best for breeding

- All Texel ewes and rams used for breeding are – on farm – judged by one of our four inspectors (69-100 points) on 8 characteristics at age 1.5-2.0 year
- >4000 phenotypes collected every year
- Since 2017 calculation of EBVs for 6 characteristics

Inspection season 2018-2019



Find the differences



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Progress in the Dutch Texel

	1997	2003	2008	2017	2018
Withers height ram age 0.5 years (cm)	57,6	60,4	62,0	63,6	63,8
Front depth ram age 0.5 years (cm)		30,8	30,3	30,6	30,9
Rump length ram age 0.5 years (cm)		67,6	70,9	72,2	72,7
Withers height ram age 1.5 years (cm)	64,9	66,6	67,5	69,6	70,8
Front depth ram age 1.5 years (cm)		34,0	33,8	35,0	35,1
Rump length ram age 1.5 years (cm)		74,6	76,9	79,8	80,6
Withers height ewe age 1.5 years (cm)				65,6	66,3
Front depth ewe age 1.5 years (cm)				33,3	33,5
Rump length ewe age 1.5 years (cm)				76,0	76,5

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Fecundity of the Dutch Texel

- Since early 80’s breeding value for fecundity
- Introduction of ‘Animal Model’ for EBV calculation: 90’s
- Heritability relatively low: 12% (0.12)
- Breeding goal Dutch Texel: 2 lambs at weaning

Progress in fecundity – Dutch Texel

Year	1995	1999	2003	2017	2018	2019
Mean littersize - age 1 (Texel)	1,23	1,19	1,30	1,42	1,45	1,45
Mean littersize - age 2 and more (Texel)	1,72	1,68	1,67	1,90	1,93	1,92
Loss of lambs at birth - age 1 ewes (%)	13,8	12,6	12,0	8,5	6,2	4,1
Loss of lambs at birth - age 2 and more (%)	10,3	10,5	8,3	7,4	8,3	7,8
Lambs born alive – age 1	1,06	1,04	1,14	1,30	1,36	1,39
Lambs born alive – age 2 and more	1,54	1,51	1,53	1,76	1,77	1,77

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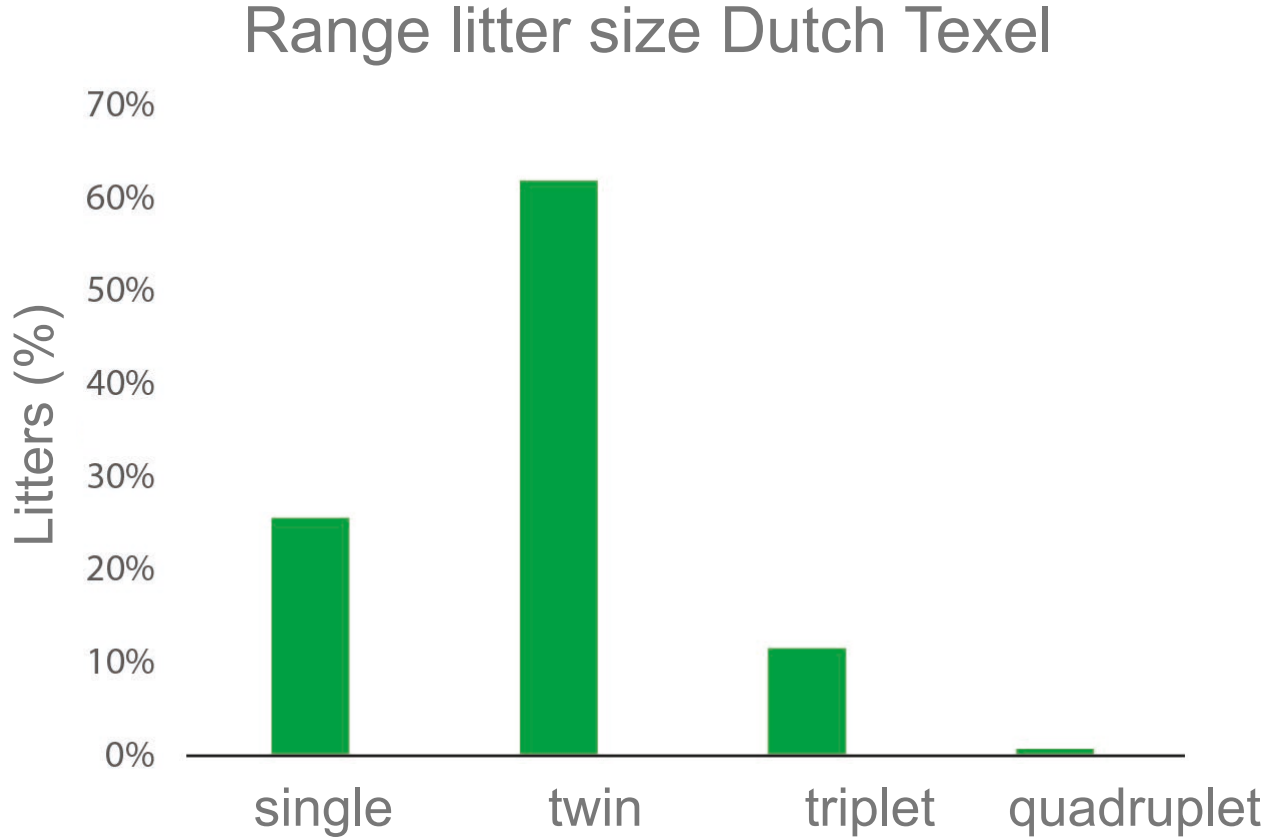
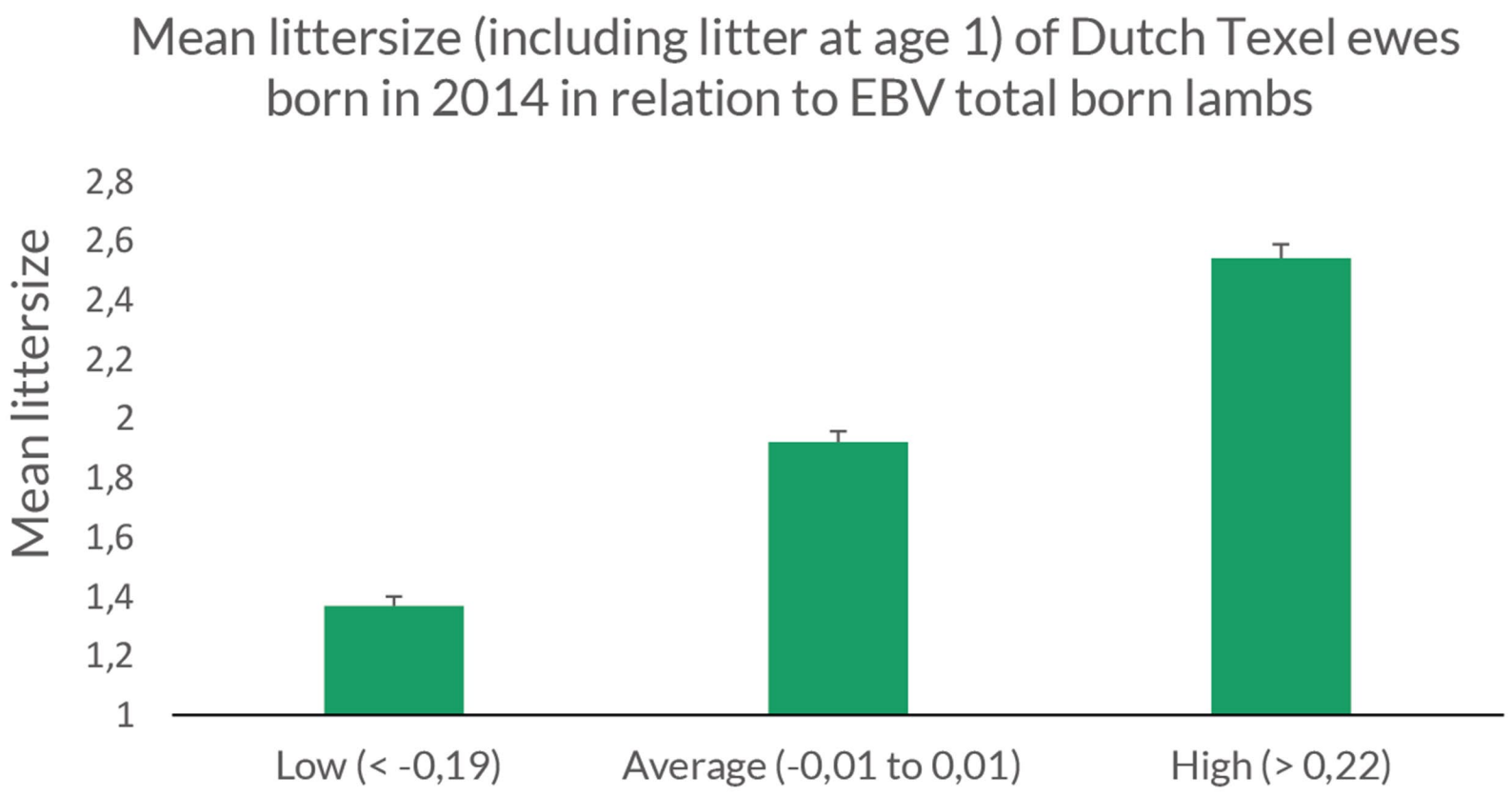
Increase in fecundity is based on reducing singletons



EBV and actual production



Effect EBV on actual production in Dutch Texel sheep (ewes born 2014; 100 ewes per group)

Group	Mean littersize	Number of litters	Life production	% ewes with litter on age 1
High	2.54	3.47	8.75 lambs	51 %
Average	1.92	3.02	5.88 lambs	20 %
Low	1.37	3.18	4.52 lambs	41 %

- In a flock of 100 ewes is the difference between ‘high’ and ‘low’ during their total life span 423 lambs
  - Around € 40.000 / £ 34.000

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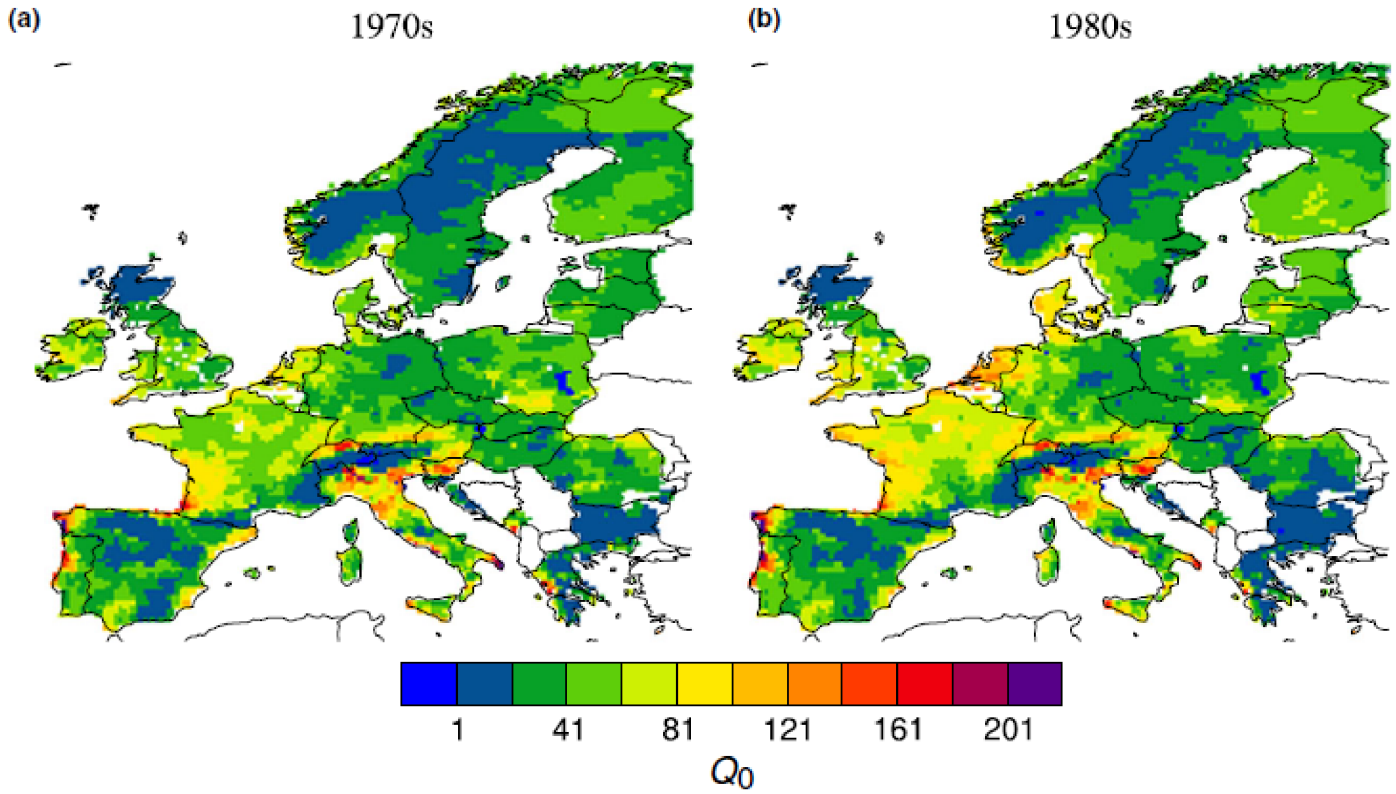
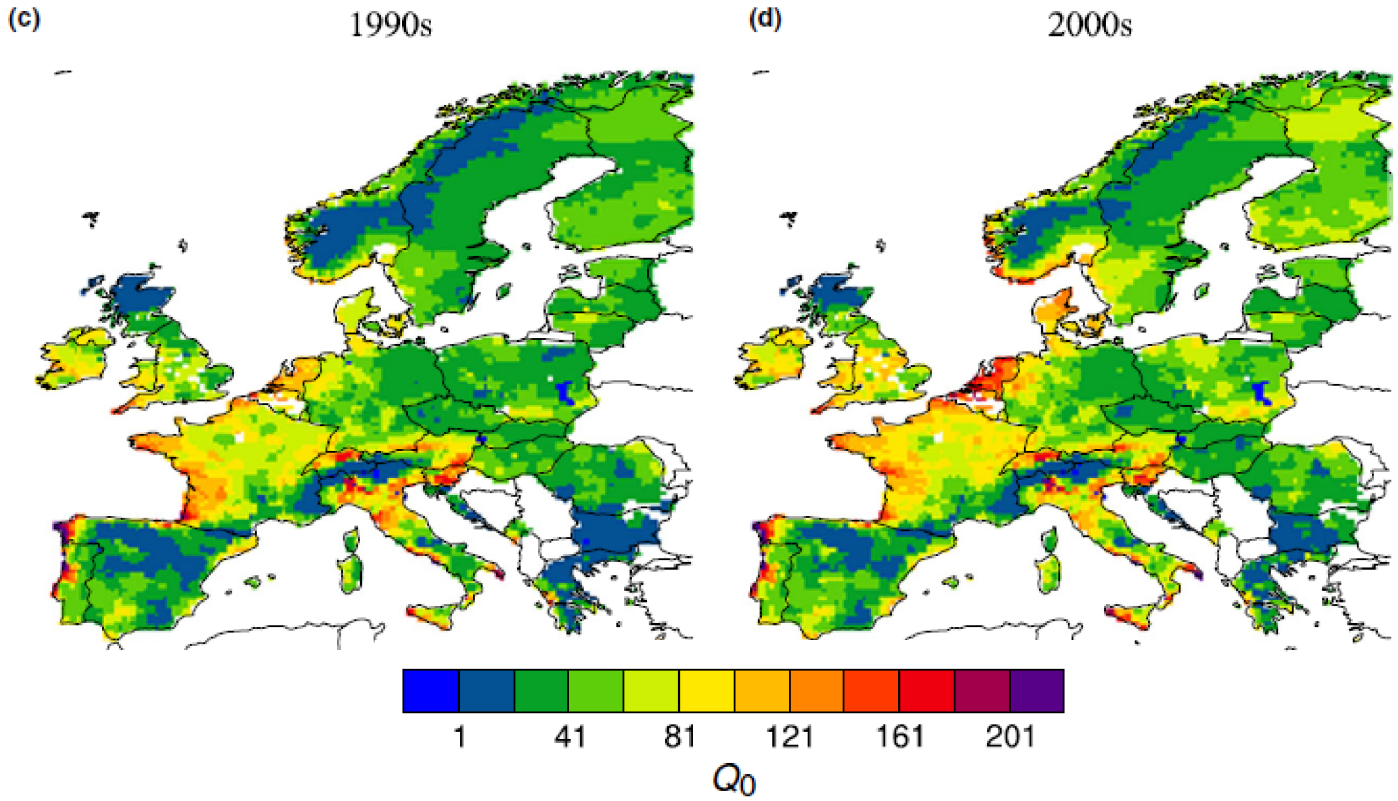
The risk of *Haemonchus* (1970-80)

(Rose et al. 2016)



The risk of *Haemonchus* (1990-2000) (Rose et al. 2016)



Resistance against anthelmintica in The Netherlands (Ploeger & Everts 2018)

Table 1: Efficacy of six anthelmintic products tested in ewes following lambing in 2015.

Anthelmintic	No. flocks tested	No. flocks showing 90-95% efficacy	Flocks showing <90% efficacy			% Flocks showing <90% FECR (*95% CI* [b])	
			No.	Median % efficacy (*range*)			
oxfendazole	30	3	22	63.9	(0 – 88.0)	73.3	(*55.6 – 85.8*)
levamisol	18	1	0			0	(*0 – 17.6*)
ivermectin	23	0	18	38.1	(*0 – 84.9*)	78.3	(*58.1 – 90.3*)
moxidectin	31	2	15	69.9	(*0 – 89.7*)	48.4	(*32.0 – 65.2*)
monepantel	25	0	2	65.3	(*46.0 – 84.5*)	8.0	(*2.2 – 25.0*)
closantel [a]	16	3	9	67.3	(*0 – 80.1*)	56.3	(*nc* [c])

So it’s clear that we need new strategies to combat worms

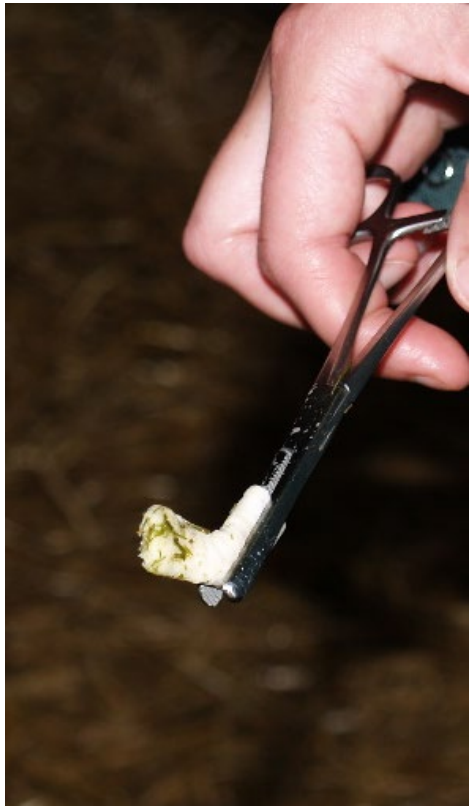
- Breeding for resistance against worminfections seems to be an interesting strategy
- But the current approach in many countries has some limitations

Dutch EBV wormresistance based on salival IgA after lambing

- Selection for wormresistance only possible after infection
  - New grazing strategies for wormcontrol postpone infections until the second half of the first grazing season – too late for first selection of lambs
- Almost all ewes have periparturient rise around lambing
  - No previous FEC sampling needed
- Sampling ewes 2-8 weeks after lambing

Determination of salival IgA

Many thanks to dr. Karen Fairlie-Clarke (UK) and dr. Harm Ploeger (NL)



Which worms after lambing?

(NSFO 2015)

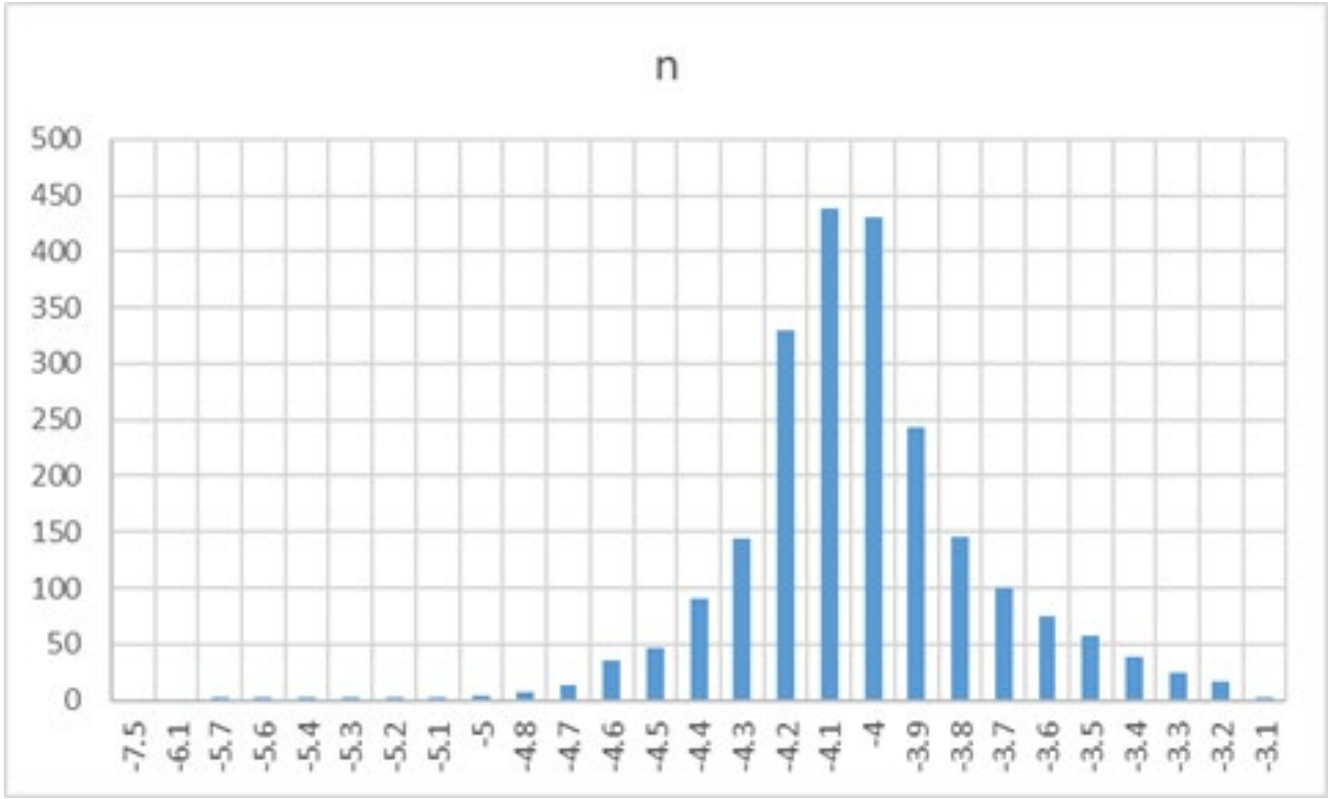
Table 11 – Outcome of the faecal cultures and larval determination for different farms

	Kl	Ev	So	No	Ka
Trichostrongylus spp.	9.5% (11/116)	25% (27/106)		6% (6/100)	
Teladorsagia	69% (80/116)	36% (38/106)		31% (31/100)	
Haemonchus	19% (22/116)	28% (30/106)		41% (41/100)	
Cooperia	0% (0/116)	0% (0/106)		2% (2/100)	
Oesophagostomum	1.7% (2/116)	0% (0/106)		19% (19/100)	
Chabertia	0.9% (1/116)	10% (11/106)		0% (0/100)	
Strongyloïdes	0% (0/116)	0% (0/106)		1% (1/100)	

IgA test primary measures response to Teladorsagia

Range of transformed IgA

n=2259; period 2014-2017 (Netherlands)



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Salival IgA in The Netherlands

Heritability

- 22% (0.22)

Genetic correlation with FEC

- -67% (-0.67)

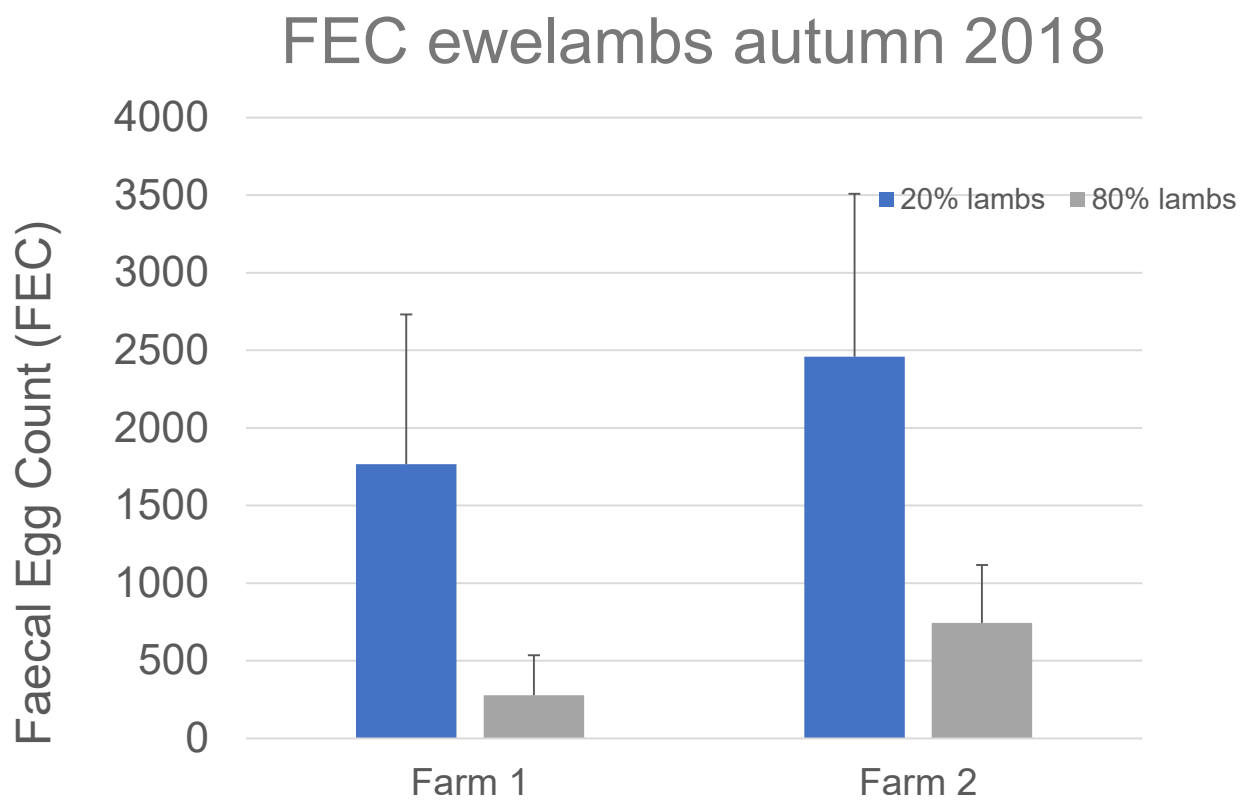
Number of sampled ewes

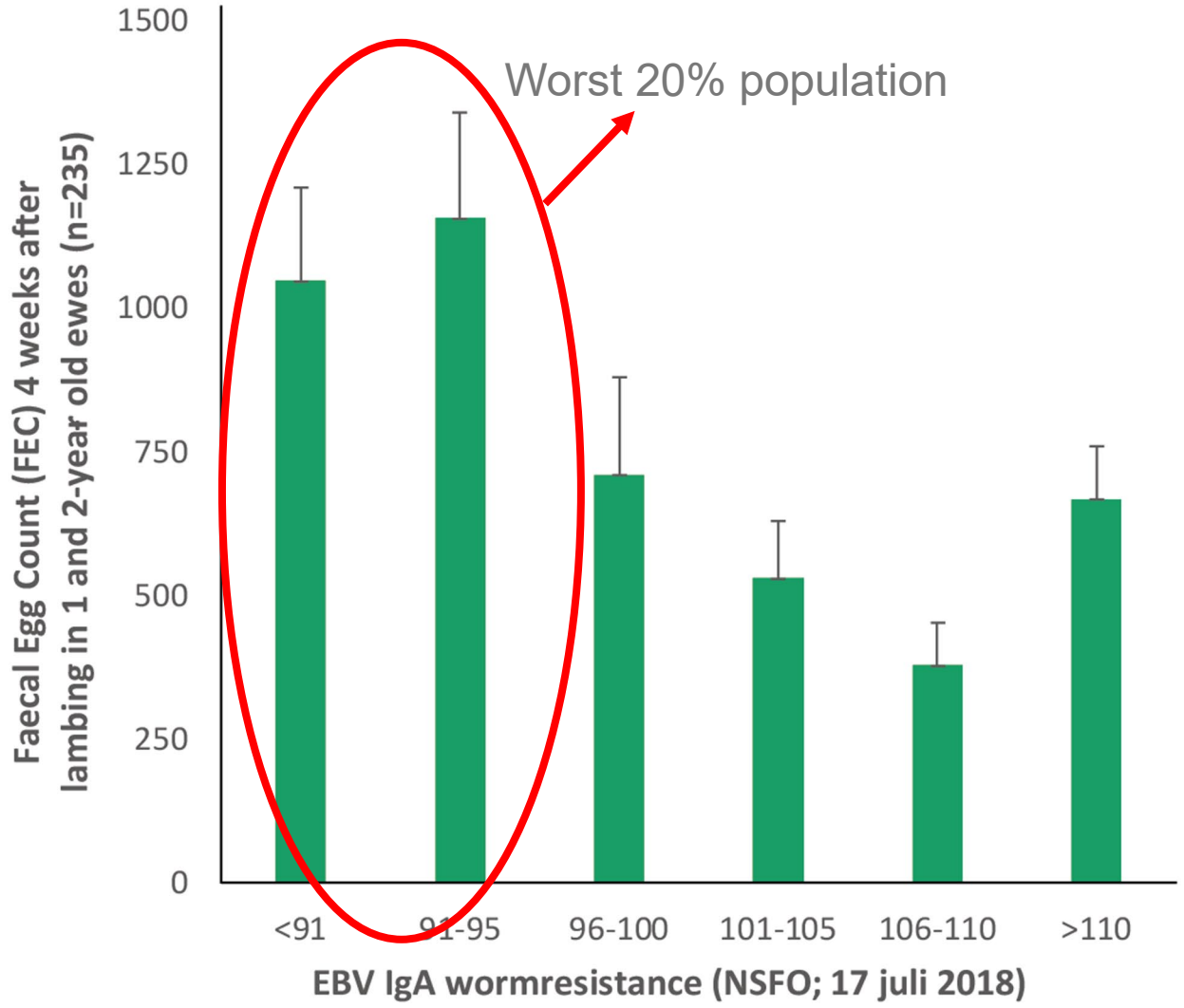
- >4.500

Number of sheep with EBV

- >10.000

20% of our sheep are responsible for 80% of faecal egg count





- We advise not to use the worst 20% for breeding

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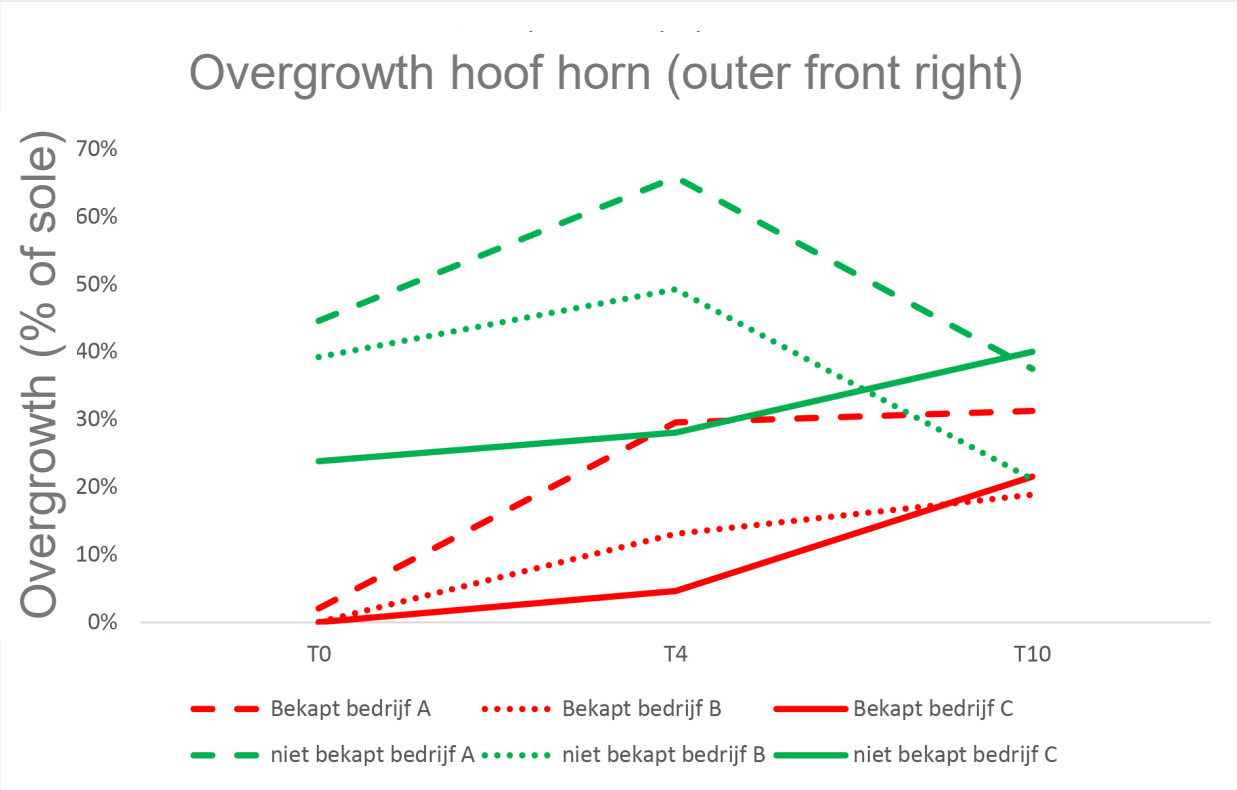
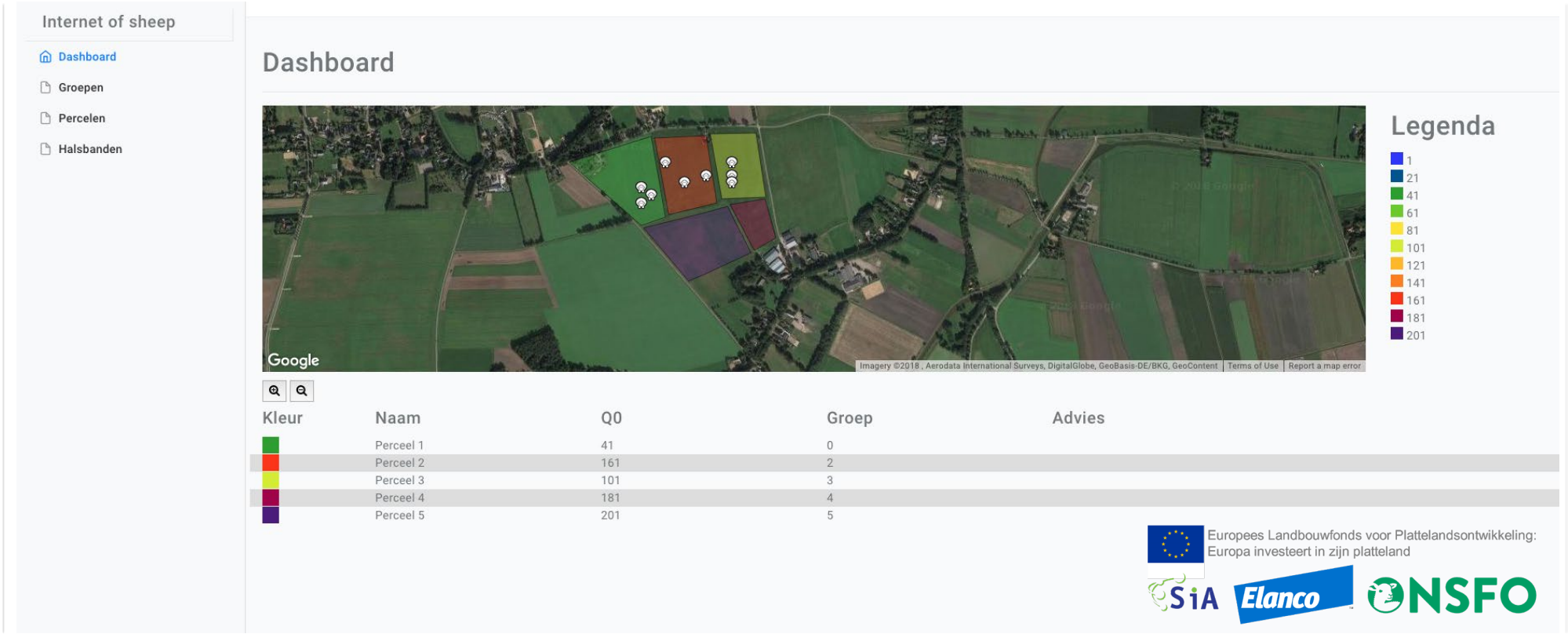
Some results of our recent research projects

- Footrot
- New strategies to combat worminfections
  - Breeding for worm resistance already presented
- Speeding up genetic improvement
  - Introduction of new EBVs since 2017 already presented

Hoofparing: 28% of Dutch farmers quit this as standard procedure



Internet of Sheep – work in progress



Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

SiA Elanco ONSFO

JONGENS VAN TECH NIEK hogeschool Universiteit Utrecht

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Internet of Sheep

- Connection sheep to the internet with sensors
  - Location is known
  - Surface of pasture can be calculated
  - Number and age of sheep in the group is known
- This data coupled with weather data can predict the increase (or decrease) in wormburden on a field
- Sheep farmer gets notification to change pasture

Newest project: Genomic selection

- Next year we will start a project to introduce genomic selection into Dutch sheep breeding
  - Measuring of methane emission
  - Reducing methane emission also by increasing fecundity and growht rates
  - Genotyping of 600 animals (15K chip)

Europees Landbouwfonds voor Plattelandsontwikkeling:
Europa investeert in zijn platteland.

provincie Gelderland

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Thanks for your attention!