HUVEPHARMA®

Efficient coccidiosis control is key for optimal intestinal health

Ben Dehaeck, DVM – global product manager anticoccidials

Teagasc Broiler Conference - Monaghan and Limerick

14-15th of October 2024

Agenda

- Introduction
  - Trends
  - Update coccidiosis
- Coccidiosis control
  - Products
  - Programmes

Introduction

Trends

Challenges and opportunities

Challenges

Reduction AB usage

Feed cost & volatility

Animal welfare

Consumer expectations

Biosecurity & disease prevention

Import/export

Environmental sustainability

Opportunities

Protein demand

Export/import

Genetic improvements

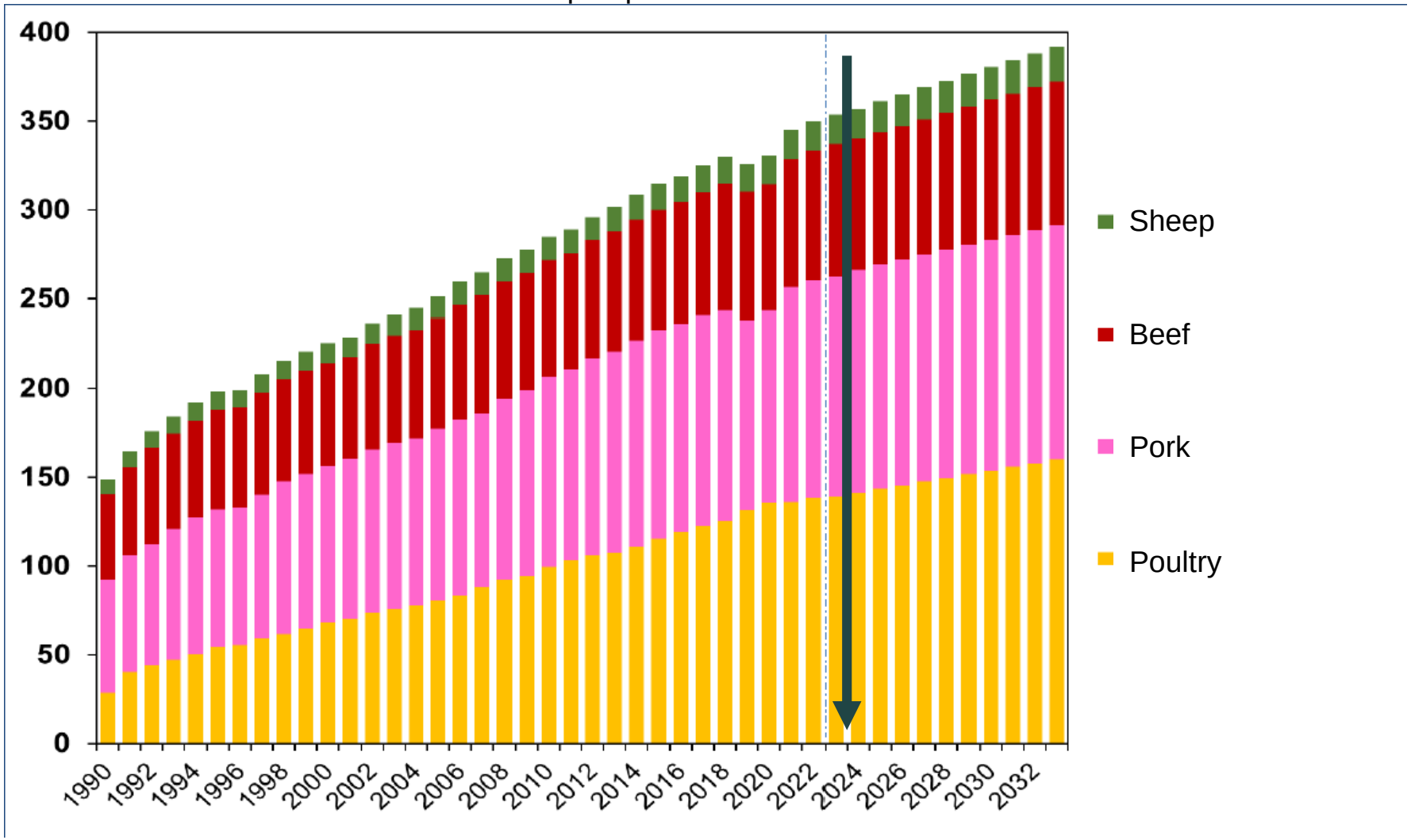
Technological innovations

Sustainability initiatives

Differentiated products

Global consumption of meat

Million tonnes between1990 and 2023 and perspective till 2033



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database),

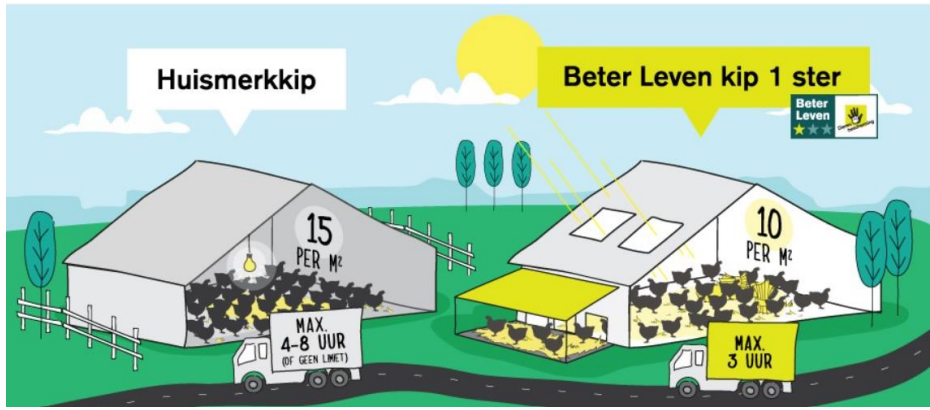
Modern animal production

- US - Restrictions on usage of products

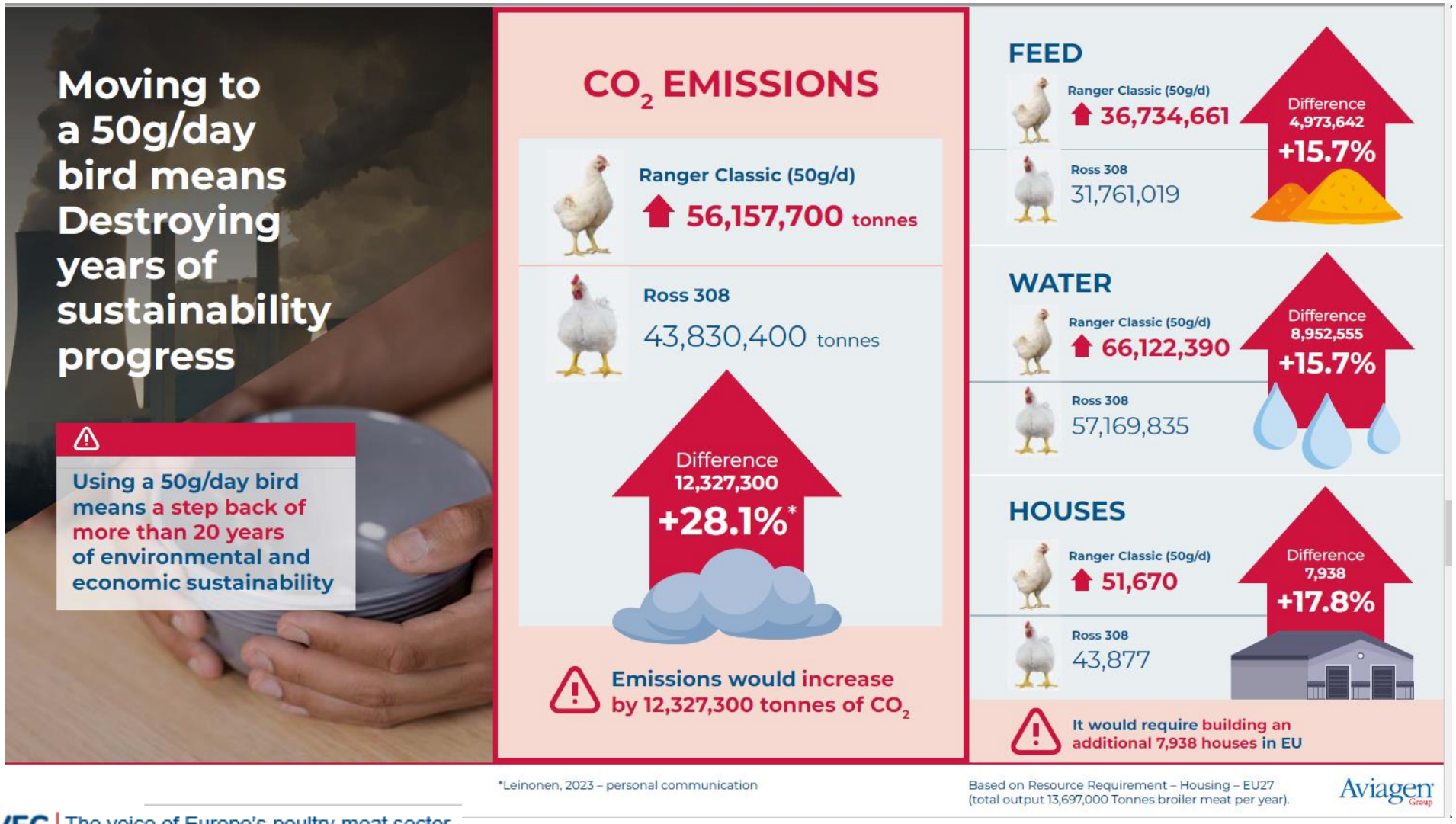
  ⇒ ABF / RWA / NAE / … => NAIHM

- EU - Animal welfare

  ⇒ slow growing birds (max 50 g/day)
  ⇒ reduced density (max 42 => 30 => 11 kg/m²)
  ⇒ dark periods / natural light
  ⇒ enrichments

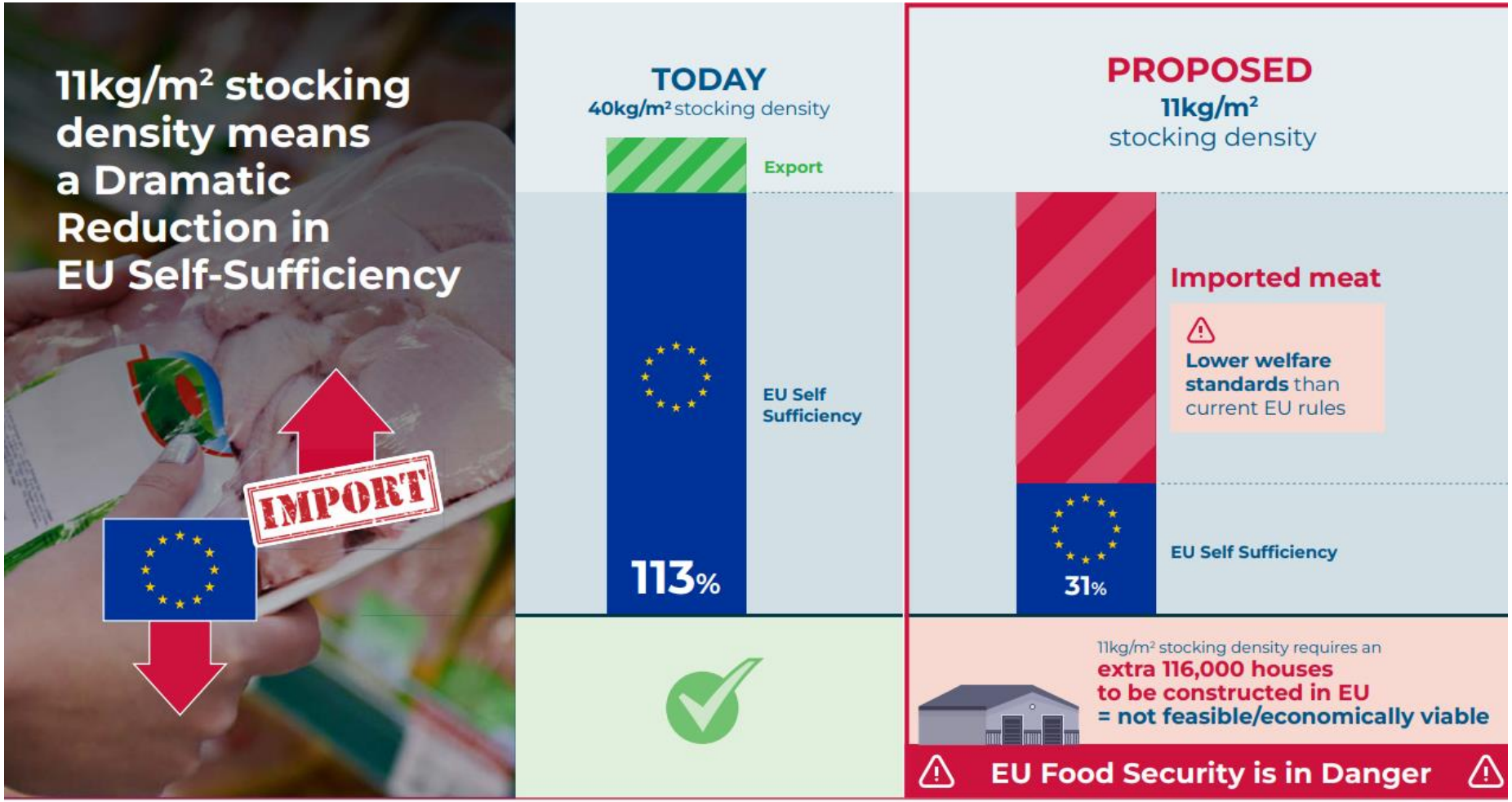


Europe – animal welfare



EFSA Scientific opinion – welfare of broilers on farm, 14 Dec 2022

Europe – animal welfare



AVEC | The voice of Europe's poultry meat sector

Aviagen Group

EFSA Scientific opinion – welfare of broilers on farm, 14 Dec 2022

Importance of ionophores

Impact of removal

- Increase costs
- Increased use of therapeutic antibiotics
- Environmental impact
- Decreased welfare

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Vet Record

REVIEW

Impact assessment of the reduction or removal of ionophores used for controlling coccidiosis in the UK broiler industry

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Abstract

Coccidiosis is a complex parasitic disease ubiquitous in all types of poultry production. It can have both a direct effect on bird health and welfare with significant negative impacts on the production parameters and indirect effect as it predisposes to other pathogens.

Ionophore coccidiostats have been used safely for over 45 years by poultry producers. Concerns have been raised that their use in livestock production could promote the development of antibiotic resistance, but their unique mode of action makes it unlikely. Conversely their removal can result in increased use of therapeutic antibiotics to treat disease posing a greater risk of antibiotic resistance development.

Economic and environmental models examining the impact of the removal of ionophore coccidiostats from UK production suggest the annual cost to the broiler sector would be between £68.02–£109.95 million and result in an additional 84,000 tonnes CO_2e being produced per annum.

Any cost increase would make this wholesome and affordable animal protein less affordable to poorer sectors of society. Increased greenhouse gas production, demand for water and land as a result of less efficient production will impact on climate change targets.

KEYWORDS
antimicrobials, coccidiosis, environmental, health, poultry, welfare

US – customer expectations

Challenges in the US

- USAHA (United States Animal Health Association) 2022

RANKING	2022 Major DISEASE Categories
1	Coccidiosis
2	Avian Influenza
3	Chick Quality and Early Mortality
4	Necrotic Enteritis
5	Gangrenous Dermatitis
6	Infectious Bronchitis- Respiratory
7	Infectious Laryngotracheitis
8	Inclusion Body Hepatitis
9	Bacterial Osteomyelitis of the Legs
10	Vertebral Osteomyelitis/Kinkyback

Changes in the US

- NAE => NAIHM

To maintain supply of the high-quality chicken you expect from us, Chick-fil-A will shift from *No Antibiotics Ever (NAE)* to *No Antibiotics Important To Human Medicine (NAIHM)* starting in the Spring of 2024.

NAE means no antibiotics of any kind were used in raising the animal. *NAIHM* restricts the use of those antibiotics that are important to human medicine and commonly used to treat people, and allows use of animal antibiotics only if the animal and those around it were to become sick.

Introduction

Update coccidiosis

Eimeria species in chicken

Operational Taxonomic Units

- OTU x – *Eimeria lata*
- OTU y - *Eimeria nagambie*
- OTU z – *Eimeria zaria*

Impact on growth

Escape immunity (no cross protection)

International Journal for Parasitology 51 (2021) 621–634

Contents lists available at ScienceDirect

International Journal for Parasitology

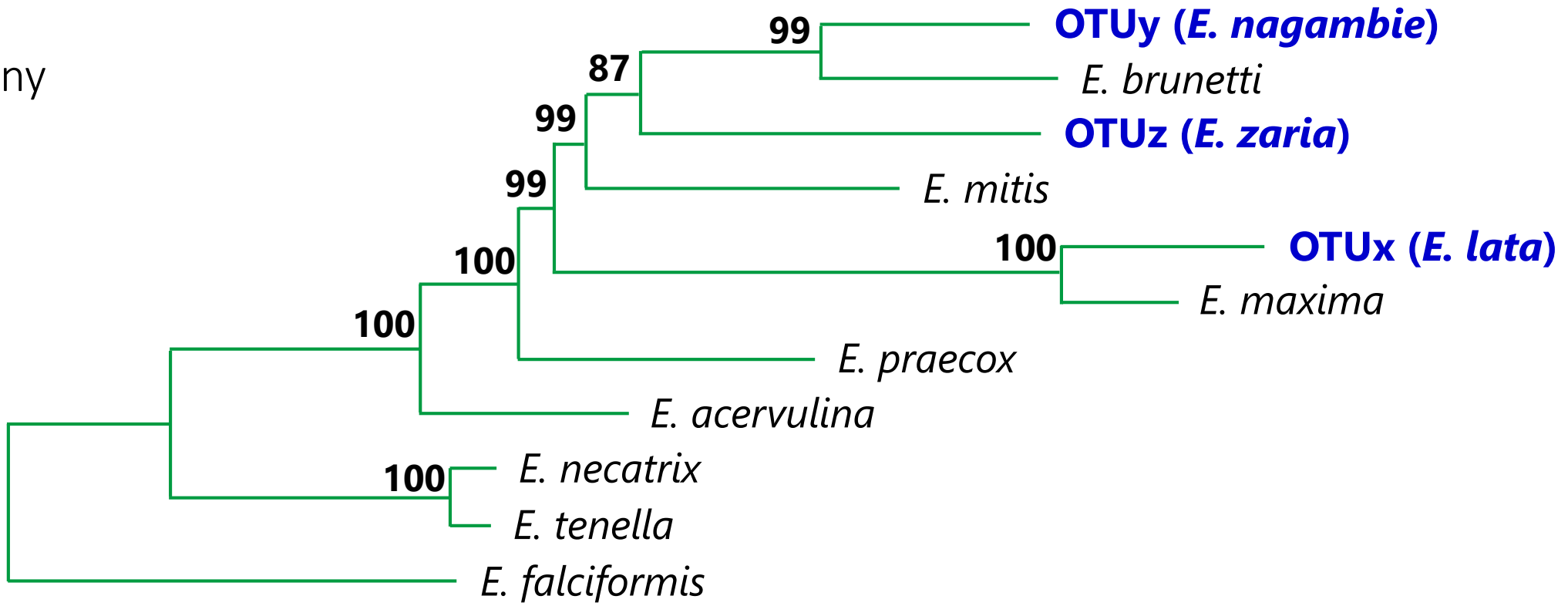
journal homepage: www.elsevier.com/locate/ijpara

Genetic and biological characterisation of three cryptic *Eimeria* operational taxonomic units that infect chickens (*Gallus gallus domesticus*) ☆

Damer P. Blake [a,*], Vladimir Vrba [b], Dong Xia [a], Isa Danladi Jatau [c], Simon Spiro [d], Matthew J. Nolan [a,1], Greg Underwood [b], Fiona M. Tomley [a]

Eimeria species in chicken

Phylogeny



Suggests three new species!

Maximum Likelihood
GTR+G
56 orthologues, concatenated
1,000 iterations

Eimeria species in chicken

Table 3
Biological characteristics of *Eimeria* spp. and Operational Taxonomic Units (OTUs) that infect chickens (*Gallus gallus domesticus*). Details for the seven recognised species derived from Long et al. (1976) and Eckert et al. (1995), where the darker shades indicate higher occurrence.

Species/OTU	Pre-patent period (h)	Fecundity	Pathogenicity	Duodenum Mid	Duodenum End	Jejunum/ Ileum	Ileum Mid	Caeca Mid	Rectum Mid
Eimeria acervulina	89	+++++	++						
Eimeria brunetti	120	++	++++						
Eimeria maxima	120	++	+++						
Eimeria mitis	91	++++	++						
Eimeria necatrix	138	+	+++++					SS	
Eimeria praecox	84	++++	+						
Eimeria tenella	132	+++	++++						
OTUx	125-130	++	+++						
OTUy [a]	132 [a]	na	+++ [a]	[a]	[a]	[a]			
OTUz	130-135	+++	++						

na, not available; SS, sexual stages.
[a]Information from Cantacessi et al. (2008); suggested location of replication.

D. Blake et al, 2021

Coccidiosis control

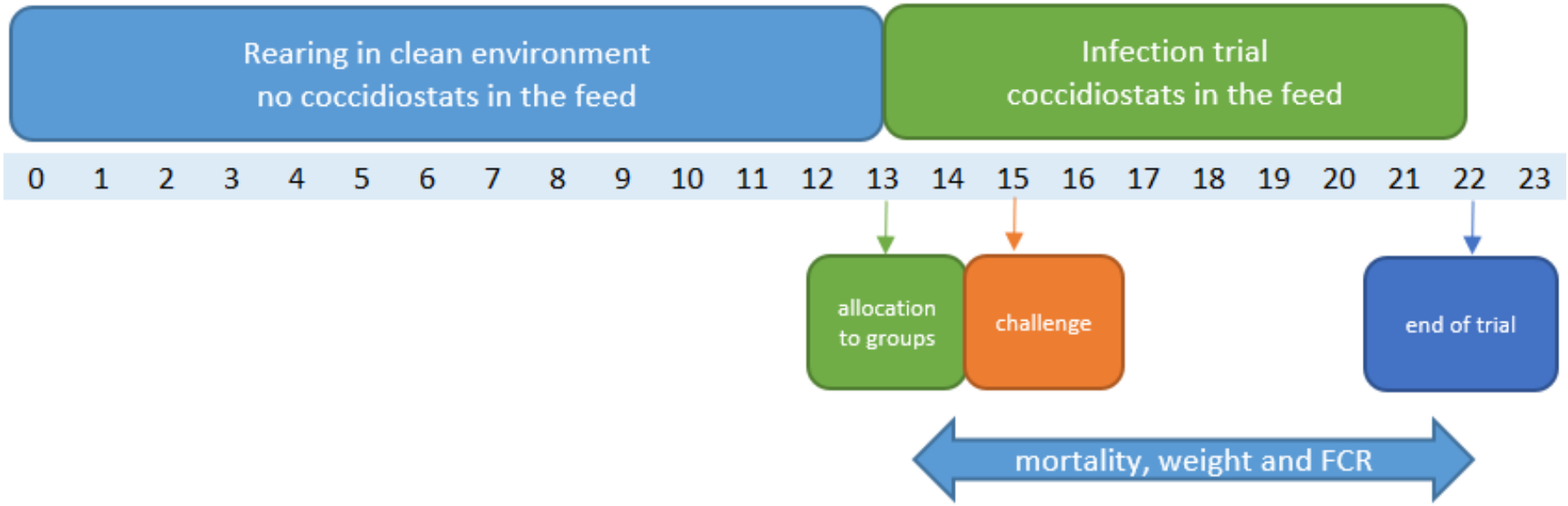
Products

EU Registered Anticoccidials - chickens for fattening

Brand Name	Compound	Company	Dose (ppm)	WT (d)	Authorised until
Robenz	Robenidine HCl	Phibro	36	5	25/02/2030
Deccox/Avi-Deccox	Decoquinate	Phibro	30-40	0	20/12/2031
Avatec	Lasalocid A sodium	Phibro	90	3	06/06/2033
Aviax	Semduramicin	Phibro	20-25	0	30/09/2034
Nicarbazin	Nicarbazin	Elanco (Phibro)	125	1	Under revision
Elancoban	Monensin sodium	Elanco	100-125	1	Under revision
Maxiban	Narasin/nicarbazin	Elanco	80-100	0	Under revision
Monteban	Narasin	Elanco	60-70	0	Under revision
Clinacox	Diclazuril	Elanco	1	0	Under revision
Monimax	**Monensin/nicarbazin**	**Huvepharma**	80-100	0	30/07/2030
Sacox	**Salinomycin sodium**	**Huvepharma**	50-70	0	09/11/2027
Stenorol	**Halofuginone**	**Huvepharma**	2-3	3	04/02/2034
Coxidin	**Monensin sodium**	**Huvepharma**	100-125	1	Under revision
Coxiril	**Diclazuril**	**Huvepharma**	0.8 -1.2	0	04/02/2025
Coxam	**Amprolium hydrchloride**	**Huvepharma**	125	0	14/12/2031

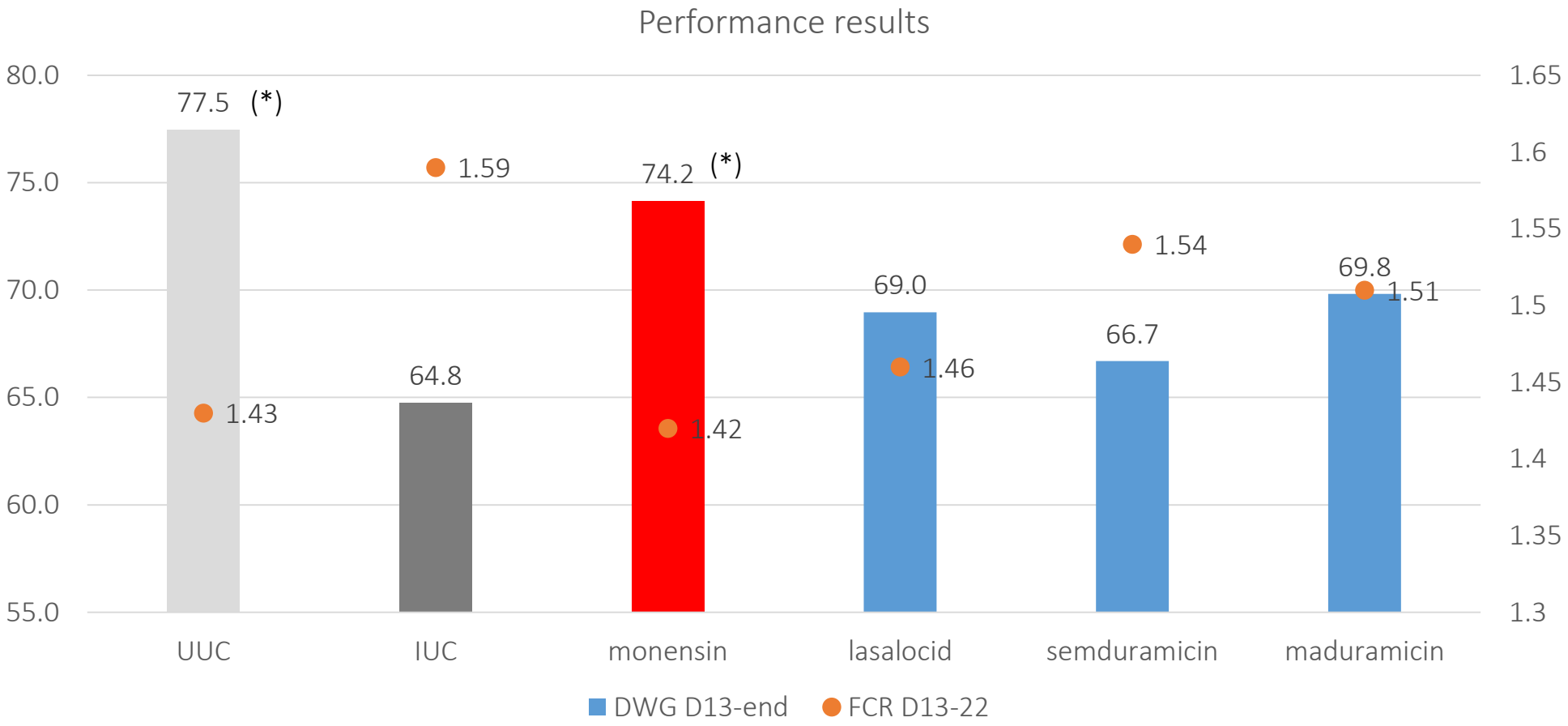
Evaluate the efficacy of products

- In vivo trials (AST)
- Inoculum - samples taken in commercial farms with broilers between the age of 17 and 31 days
- Standardised protocol



Comparison ionophores

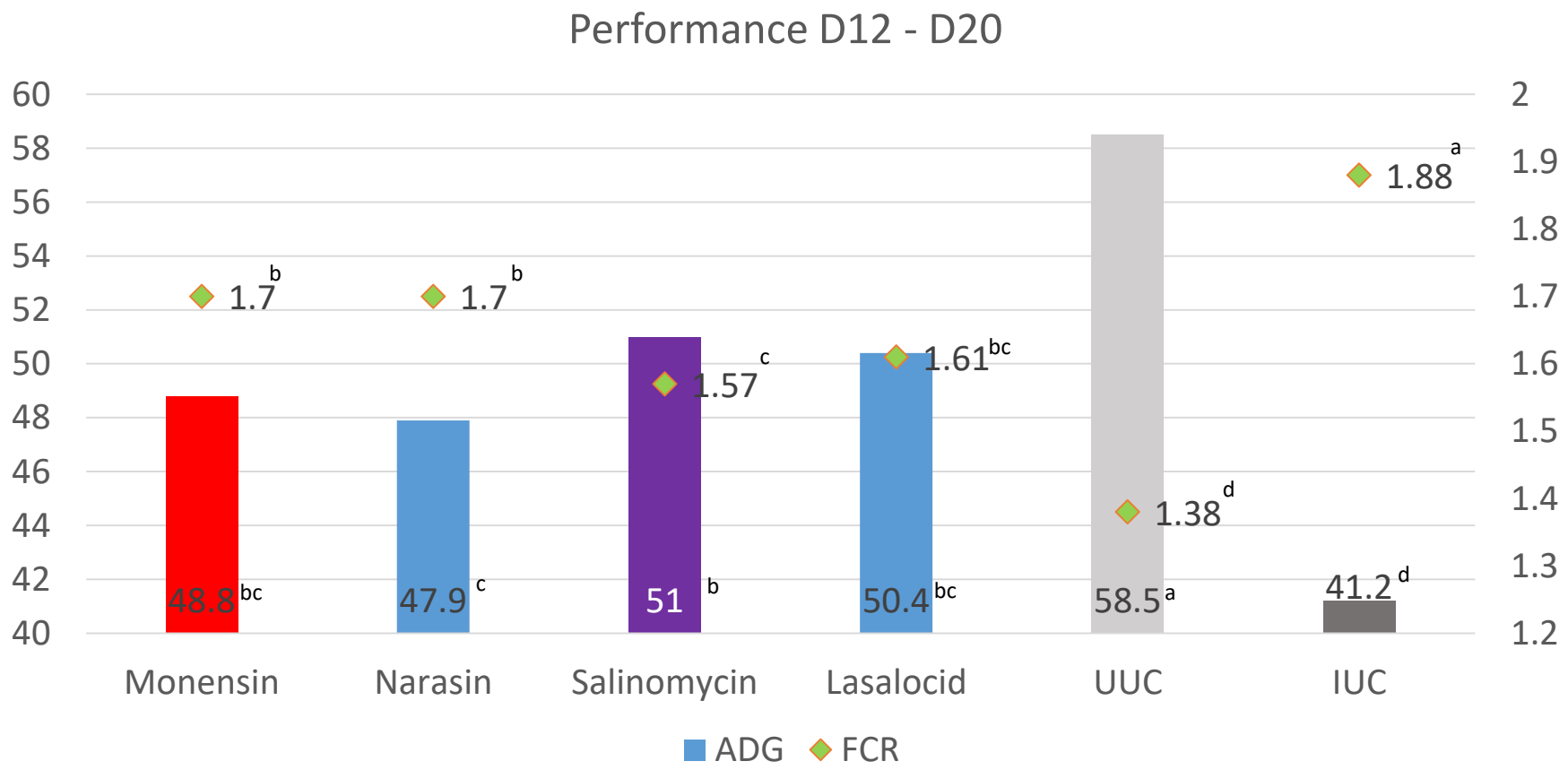
- Results depend on intrinsic activity and history of cox usage



(*) indicate a significant difference compared with the IUC with p < 0.01

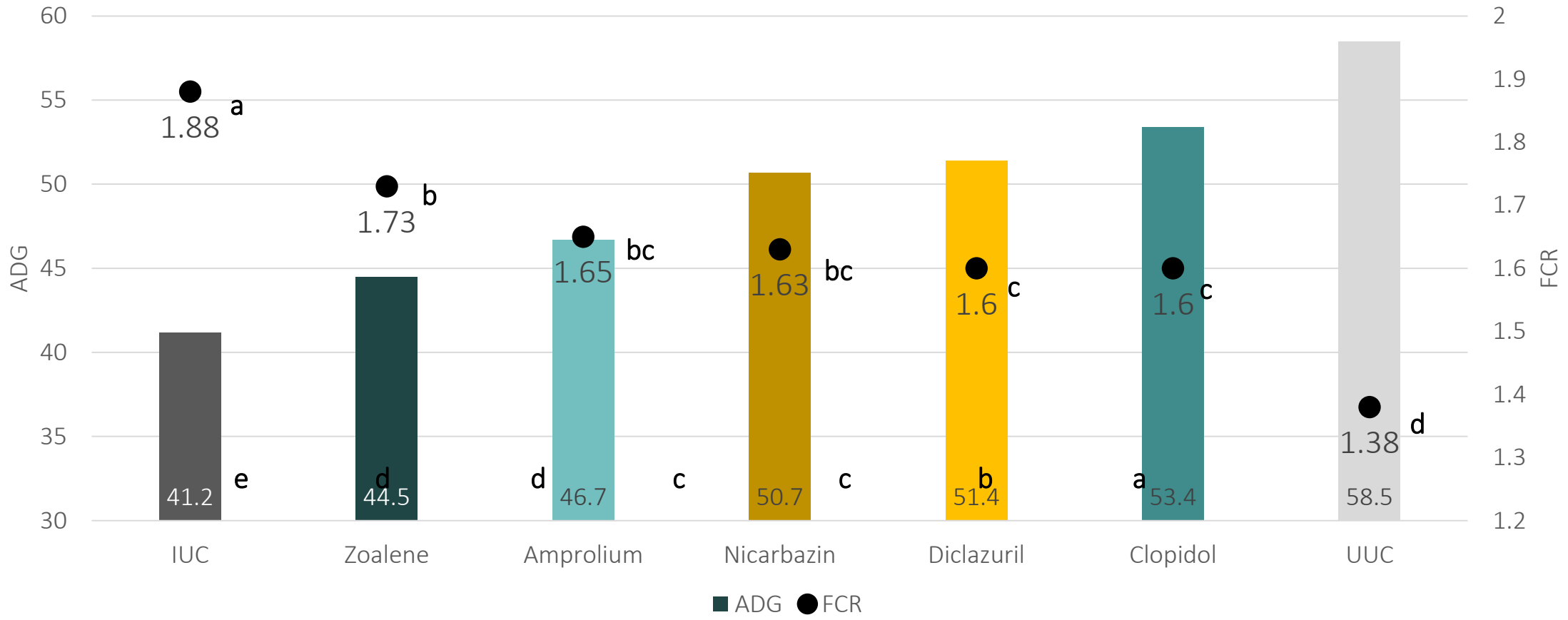
Comparison ionophores

- Results depend on intrinsic activity and history of cox usage



Comparison chemical products

- Results from samples taken in the US



Comparison combination products

Year	Inocula origin	Research Institute	*Eimeria* species present in the inoculum	combi (ppm)
2013	Israel	INRA, France	*E. acervulina, E. tenella*	80
2013	UK	INRA, France	*E. acervulina, E. maxima, E. tenella*	80
2013	Italy	INRA, France	*E. acervulina, E. maxima, E. tenella*	100
2013	France	INRA, France	*E. acervulina, E. maxima, E. tenella*	100
2014	Belgium	Poulpharm, Belgium	*E. acervulina, E. maxima, E. tenella*	80
2014	EU	Poulpharm, Belgium	*E. acervulina, E. maxima, E. tenella*	80
2014	Poland	INRA, France	*E. acervulina, E. tenella*	80
2014	Poland	INRA, France	*E. acervulina, E. tenella*	80 / 100
2014	Germany	INRA, France	*E. acervulina, E. maxima, E. tenella*	100
2015	Russia	INRA, France	*E. acervulina, E. maxima*	80
2016	Lithuania	Poulpharm, Belgium	*E. acervulina, E. tenella*	100
2016	Poland	INRA, France	*E. acervulina*	100
2016	France	INRA, France	*E. acervulina, E. maxima, E. tenella*	100
2016	New Zealand	INRA, France	*E. acervulina*	100
2017	Russia	Poulpharm, Belgium	*E. acervulina, E. tenella*	80
2017	Russia	Poulpharm, Belgium	*E. acervulina, E. maxima, E. tenella*	80
2017	UK	Poulpharm, Belgium	*E. acervulina, E. maxima, E. tenella*	100
2017	Italy	Poulpharm, Belgium	*E. acervulina, E. maxima, E. tenella*	80
2017	New Zealand	INRA, France	*E. acervulina*	100
2018	Germany	Poulpharm, Belgium	*E. acervulina, E. tenella*	100
2018	Belgium	Poulpharm, Belgium	*E. acervulina*	80
2018	Russia	Poulpharm, Belgium	*E. acervulina*	80
2018	Denmark	INRA, France	*E. acervulina, E. maxima, E. tenella*	80
2018	New Zealand	INRA, France	*E. acervulina, E. maxima*	100
2018	New Zealand	INRA, France	*E. acervulina, E. maxima, E. tenella*	100
2018	Poland	INRA, France	*E. acervulina, E. maxima, E. tenella*	100
2019	Philippines	Poulpharm, Belgium	*E. acervulina, E. maxima*	100

Comparison combination products

Lesion scoring results

Lesion scores	*E. acervulina*	*E. maxima*	*E. tenella*
IUC	2.02[a]	1.20[a]	1.81[a]
Nicarbazin/monensin	**1.69[c]**	**0.93[c]**	**1.38[b]**
nicarbazin/narasin	1.98[a]	1.04[b]	1.44[b]
UUC	0.34[d]	0.48[d]	0.49[c]

Different letters indicate significant differences at p<0.01.

Performance results

	DWG	DFI	FCR
IUC	46.0[c]	87.1[c]	2.07[c]
Nicarbazin/monensin	**55.0[b]**	**90.2[b]**	**1.72[b]**
nicarbazin/narasin	53.8[b]	89.2[bc]	1.75[b]
UUC	67.0[a]	97.4[a]	1.47[a]

Different letters indicate significant differences at p<0.01.

Coccidiosis control

Programmes

Coccidiosis control programmes

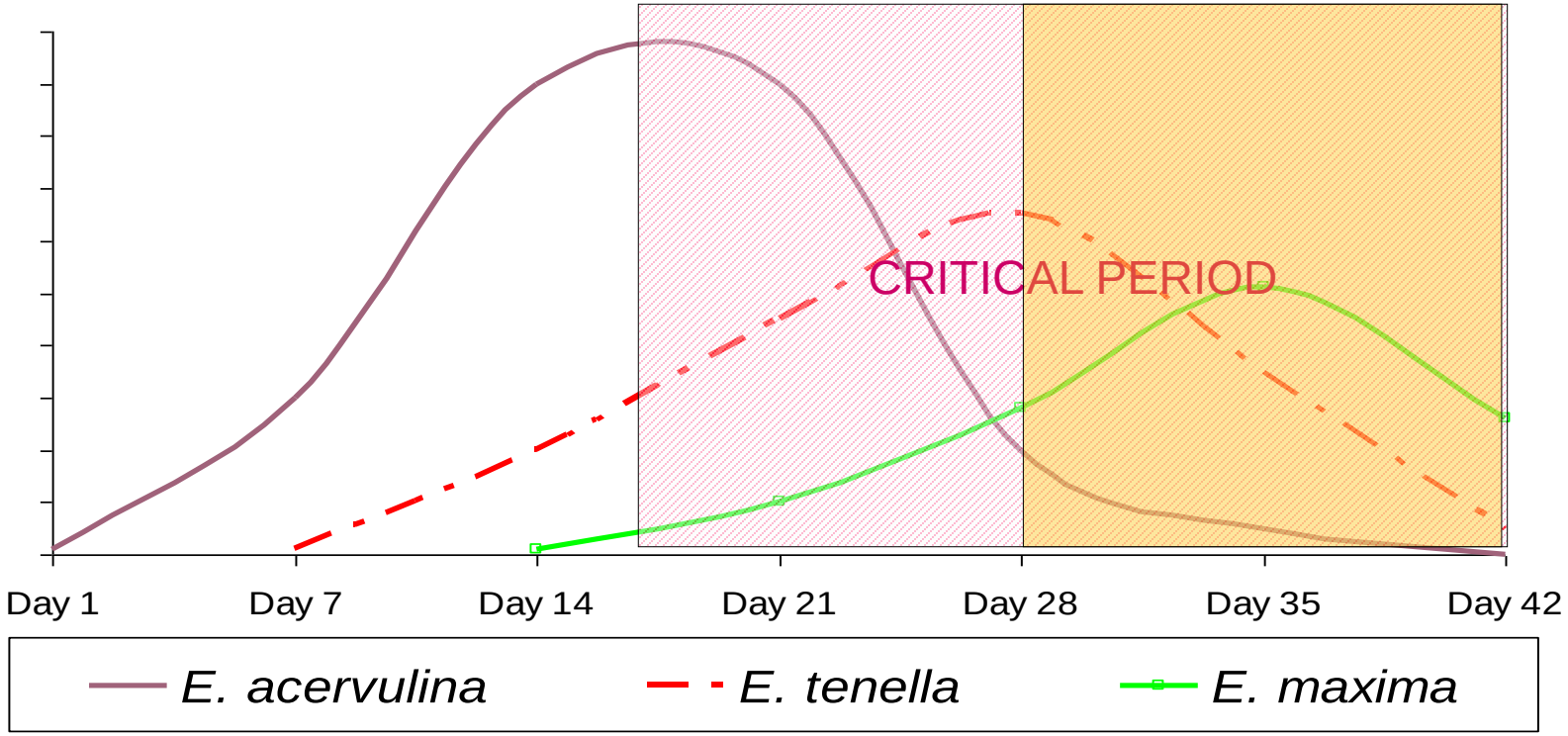
- Depends on coccidiosis pressure
- Which products have been used before
- Climate (wet/dry season vs winter/summer season)
- Dynamics of different species (peak of the cox pressure)

=> important to follow trends in the field!

Coccidiosis control programme		Coccidiosis pressure	Season	Advantage	Disadvantage
Combination*		High to very high infection pressure		Synergistic effect by combining a chemical and an ionophore. Ionophore in grower and finisher phase.	Potential selection for reduced sensitivity to 2 active compounds in case of overuse.
Chemical	Chemical	High to very high infection pressure Clean-up before vaccination		In case of chemical with zero day withdrawal being used: strong coccidiosis control until slaughter. Ideal for clean-up in high pressure environment.	Potential selection for reduced sensitivity to 2 products. No ionophore in grower/finisher phase.
Combination	Chemical	High to very high infection pressure		In case of chemical with zero day withdrawal being used: strong coccidiosis control until slaughter.	Potential selection for reduced sensitivity to 2 products. No ionophore in grower/finisher.
Combination	Ionophore	Moderate to high infection pressure		Strong synergistic effect in starter phase. Ionophore in grower/finisher phase.	Potential selection for reduced sensitivity to 2 products.
Chemical	Ionophore	Moderate to high infection pressure		Safe use of a chemical. Presence of ionophore in grower/finisher phase.	Risk for resistance development in case of overuse. Potential selection for reduced sensitivity to 2 products.
Ionophore	Chemical	Moderate to high infection pressure. Clean-up before vaccination		Reduce infection pressure at end of grow-out. Safe use of a chemical. Allows immunity development.	No ionophore in finisher phase. Potential selection for reduced sensitivity to 2 products.
Ionophore	Ionophore	Low to moderate infection pressure. After vaccination		–	Potential selection for reduced sensitivity to 2 products.
Ionophore		Low to moderate infection pressure. After vaccination.		Slow resistance development. Allows immunity development. Ionophore in grower/ finisher phase.	Not suitable in conditions with high infection pressure.
Coccidiosis vaccination		Decreased sensitivity to anticoccidials		Restore efficacy anticoccidials.	No ionophore in grower/finisher phase.

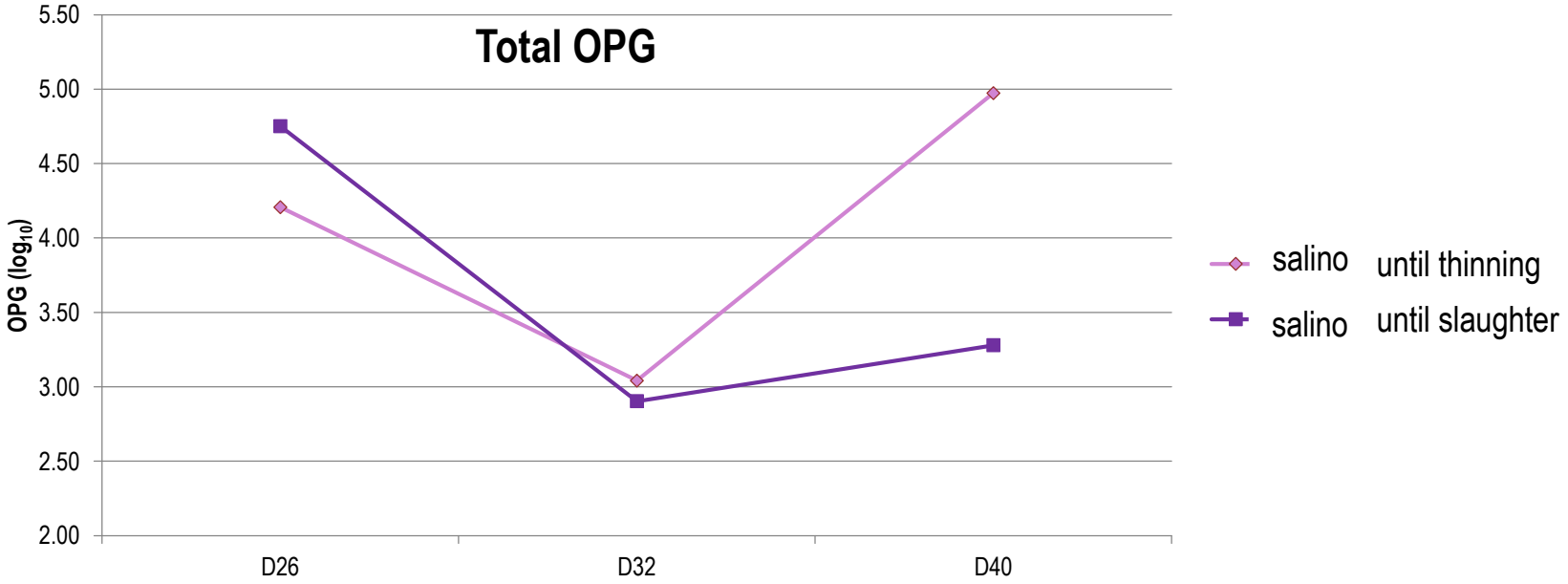
Anticoccidial programmes

- Protection until the end



Anticoccidial programmes

- Positive effect on next flock - field trial Belgium (2018)
  - Commercial broiler farm with 2 houses (12,400 birds/house)
  - Groups
    - Salinomycin (70 ppm) until slaughter (D40)
    - Salinomycin (70 ppm) until thinning (D32)

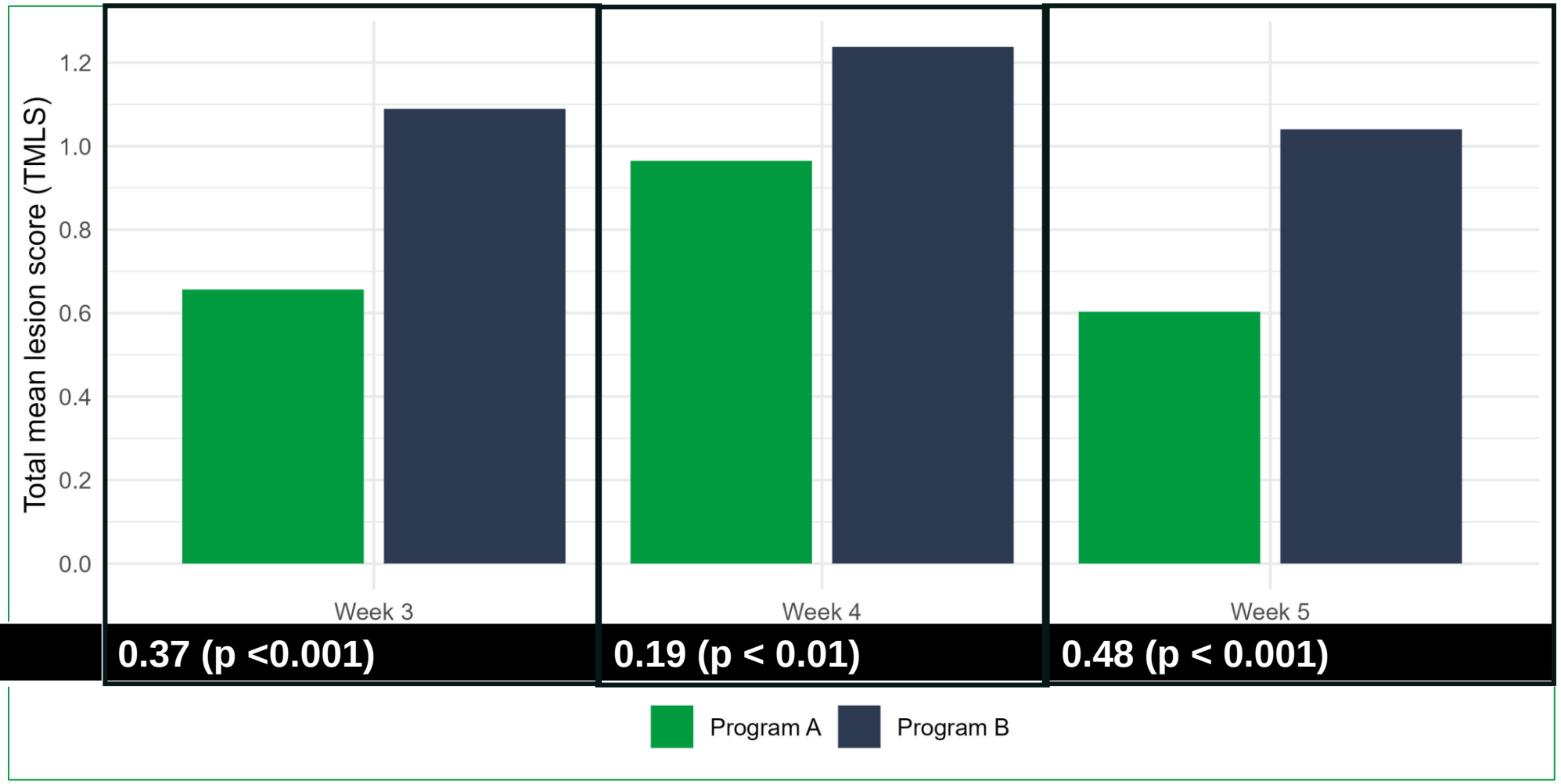


Comparison of 2 shuttle programmes

- Platform comparison on parasitology (Europe)
  - Program A: Nicarbazin + monensin - salinomycin
  - Program B: Nicarbazin + narasin - narasin

Program	Countries	Farms	Flocks	Avg days to switch
Nicarbazin+monensin-salinomycin	4	209	815	17.56
Nicarbazin+Narasin-Narasin	5	196	451	18.62

Comparison of 2 shuttle programmes



	Week 3	Week 4	Week 5
Difference	**0.37 (p <0.001)**	**0.19 (p < 0.01)**	**0.48 (p < 0.001)**

Advise Huvepharma®

- Rotation
  - Alternating of different chemotherapeutic products
  - Respect timing (use and rest)
    - Chemical – shuttle = 2 cycles / max 1 per year
    - Ionophore – 6 months / 6 months
    - Combination – 9 months / 3 months
  - Chemical clean-up once a year
- Vaccination in case rotation doesn’t bring benefit

Shaping livestock solutions