

Feeding chicory (*Cichorium intybus*) selectively reduces *Ostertagia ostertagi* infections in cattle



Miguel Peña-Espinoza^{a*}, Olivier Desrues^b, Tina Hansen^b, Stig M. Thamsborg^b, Heidi L. Enemark^{a,c}

^aNational Veterinary Institute, Technical University of Denmark (DTU)

^bDepartment of Veterinary Disease Biology, Faculty of Health and Medical Sciences, University of Copenhagen

^cNorwegian Veterinary Institute, Oslo, Norway



Background:

- In vivo* anthelmintic (AH) effects of **forage chicory** have been reported in sheep and deer, but not in cattle
- Potential anti-parasitic effects of bioactive plants like forage chicory may be direct or indirect through improved nutrition

Objectives:

- To test the AH effects of a forage chicory diet against gastrointestinal nematodes in calves fed with iso-proteic and iso-energetic diets (**Study 1**) and in calves under grazing conditions (**Study 2**)

Conclusions:

- Study 1:** Feeding with chicory silage significantly reduced *O. ostertagi* but not *C. oncophora* adult burdens in calves, without compromising animal growth
- Study 2:** Grazing of pure chicory significantly reduced excretion of *O. ostertagi* eggs and adult burdens in calves, but poor animal growth was observed
- The time course of infection indicates that main effect of a forage chicory diet is on survival of *O. ostertagi* adults

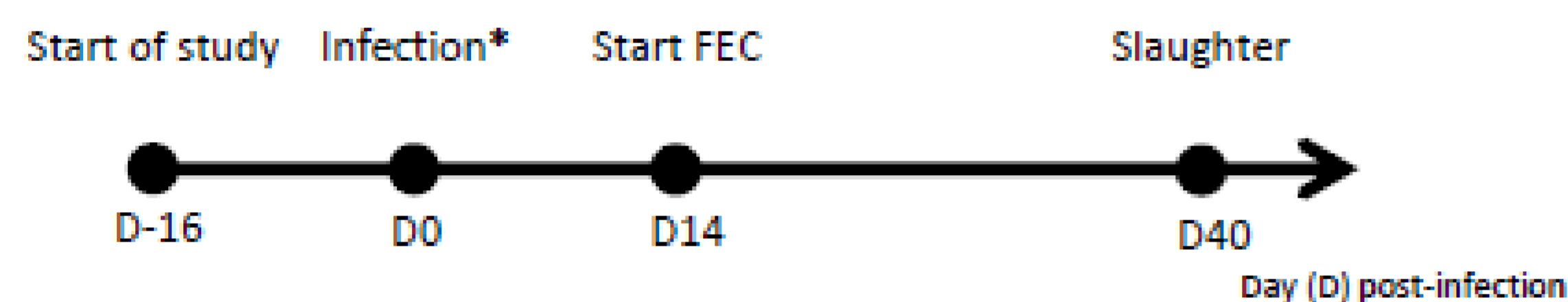


Study 1: AH effects of ensiled forage chicory in calves experimentally infected with *Ostertagia ostertagi* and *Cooperia oncophora* and fed with iso-proteic and iso-energetic diets

Methods:

- 2-4 months-old calves were allocated into chicory (n=9) or control (n=6) groups and fed with ensiled chicory or ryegrass hay, resp., from start of study until slaughter. Calves were stabled throughout the study

Study design:



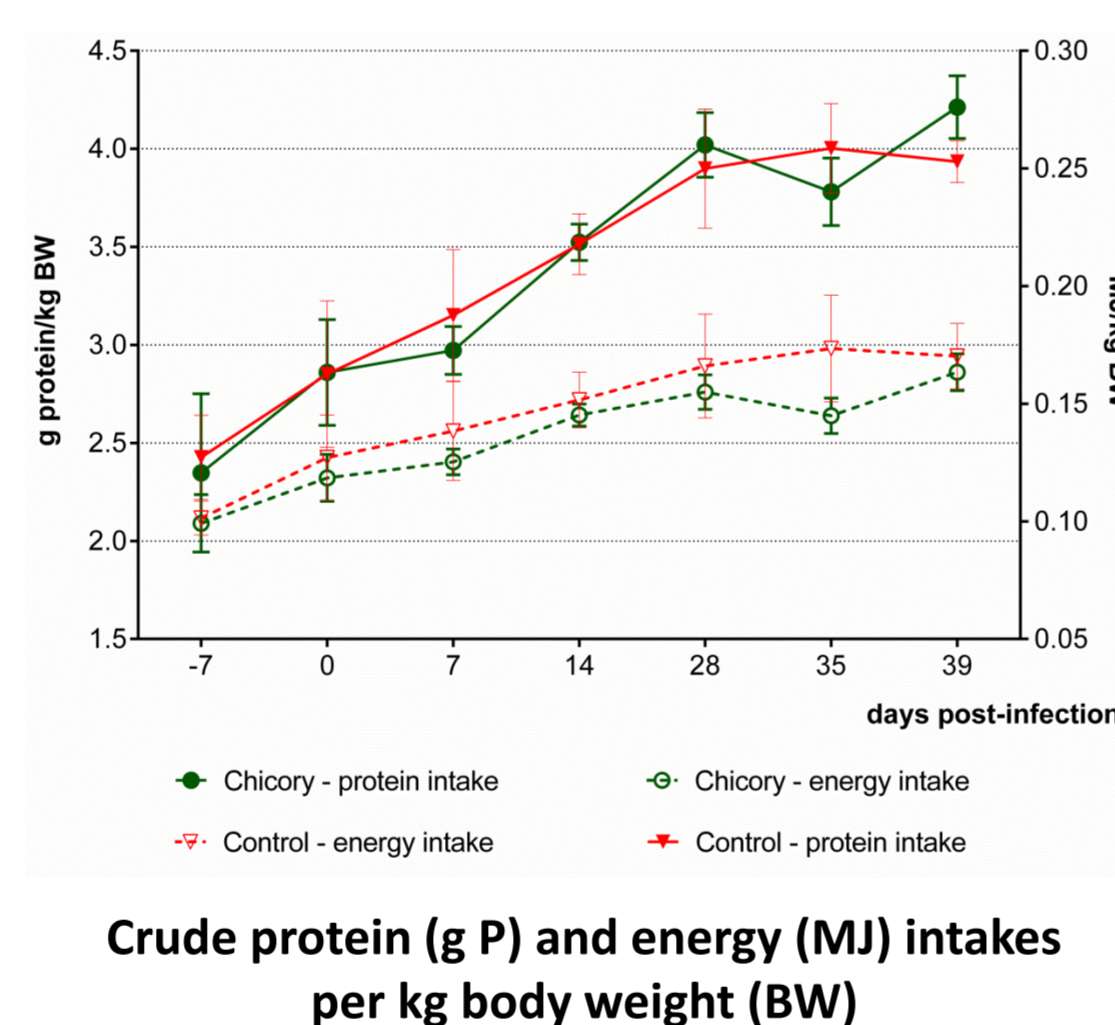
*Infective dose: 10,000 *O. ostertagi* L3 + 66,000 *C. oncophora* L3

- Crude protein (CP)/energy (MJ) intakes were balanced between groups based on daily measurements of dry matter (DM) intake
- Faecal egg counts (FEC) were performed from D14 and calves were slaughtered at D40 for worm recovery

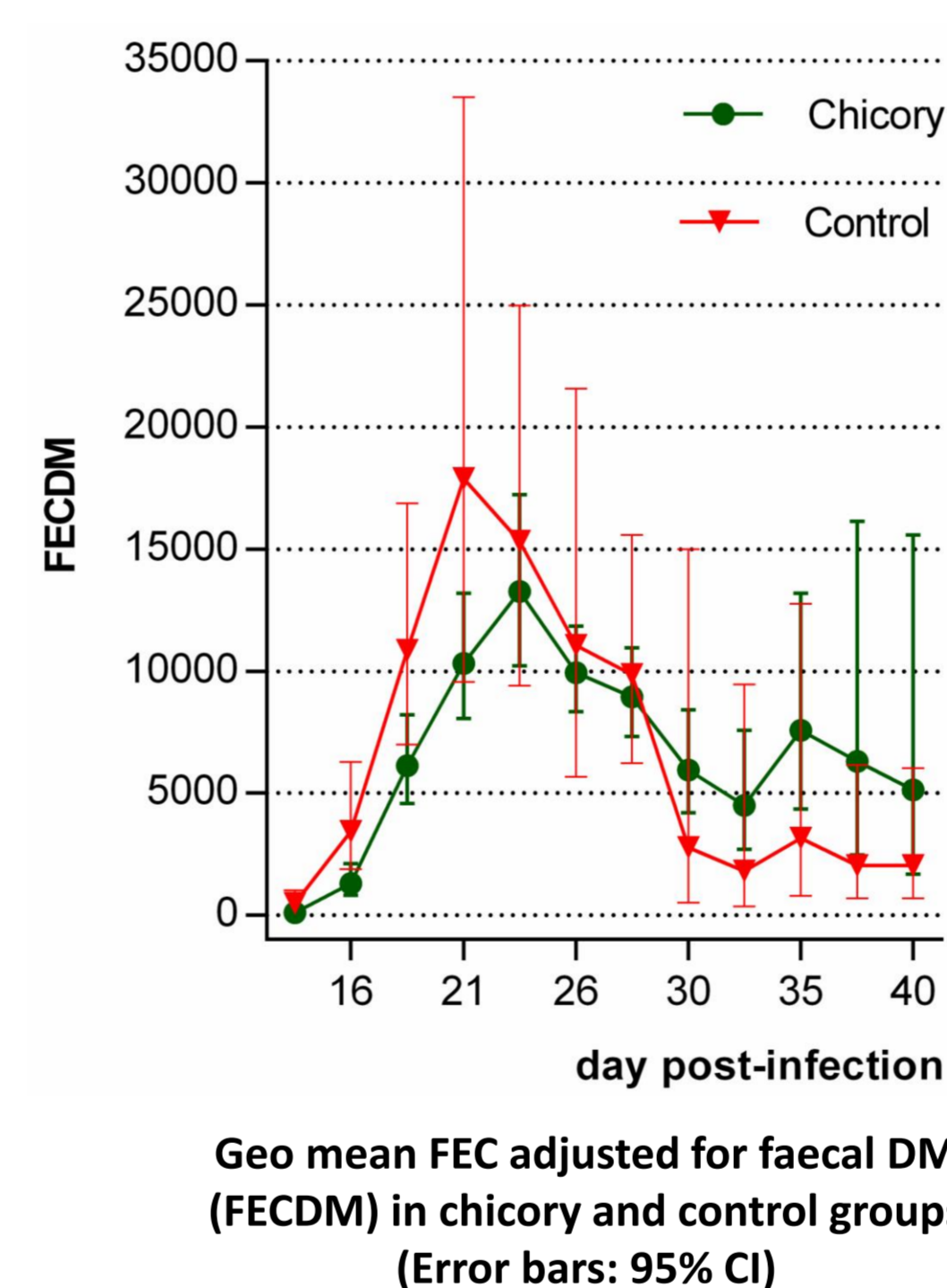


Chicory group (n=9)

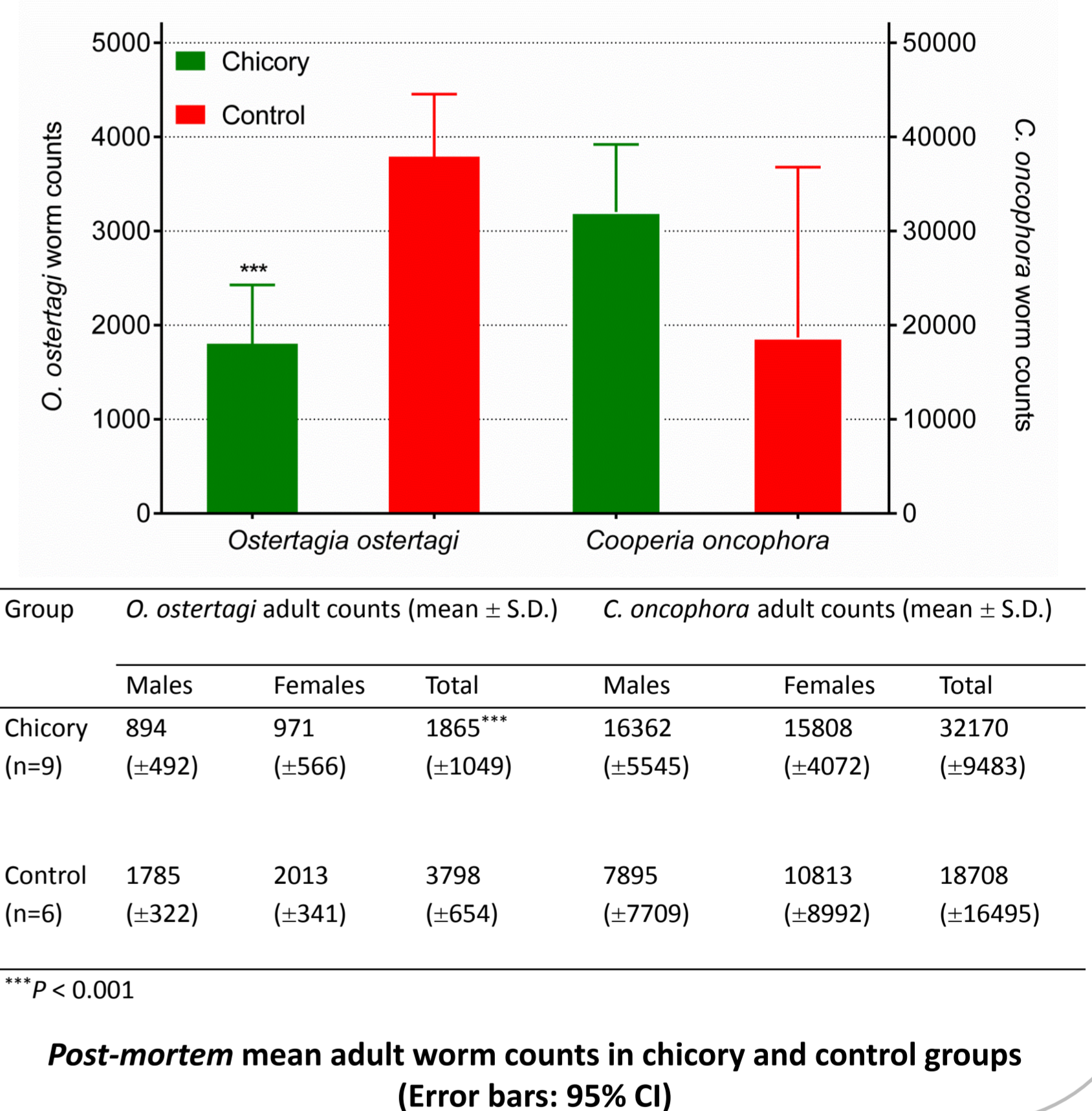
Control group (n=6)



- No differences in weight gain between groups until D21
- From D21 until slaughter, chicory and control groups had mean growth rates of 768 and 370 g/day, resp. ($P=0.004$)
- No differences in serum pepsinogen, FEC or DM/CP/E intakes between groups
- Chicory-fed calves had a significant reduction in the worm burden of *O. ostertagi* ($P<0.001$) but not of *C. oncophora* ($P=0.1$), compared with controls



Results:

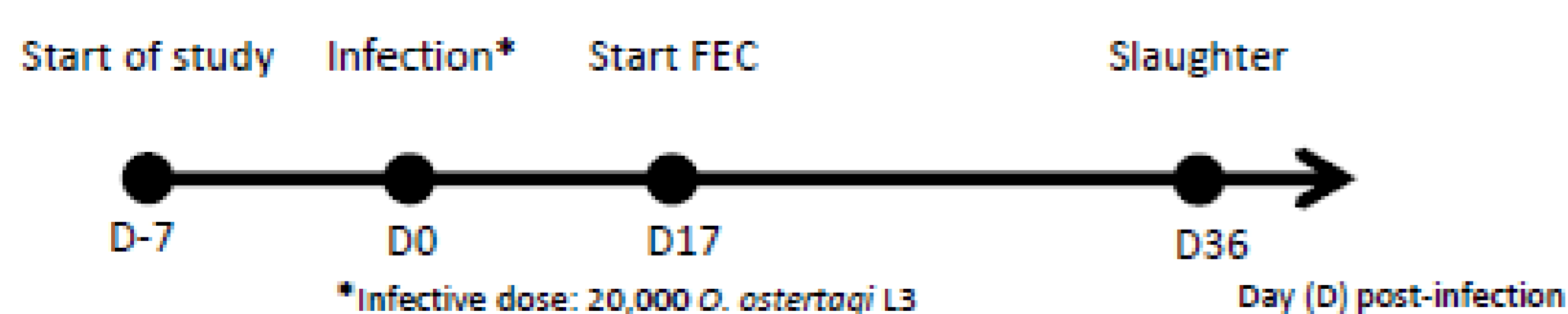


Study 2: AH effects of grazing a pure forage chicory sward in calves experimentally infected with *Ostertagia ostertagi*

Methods:

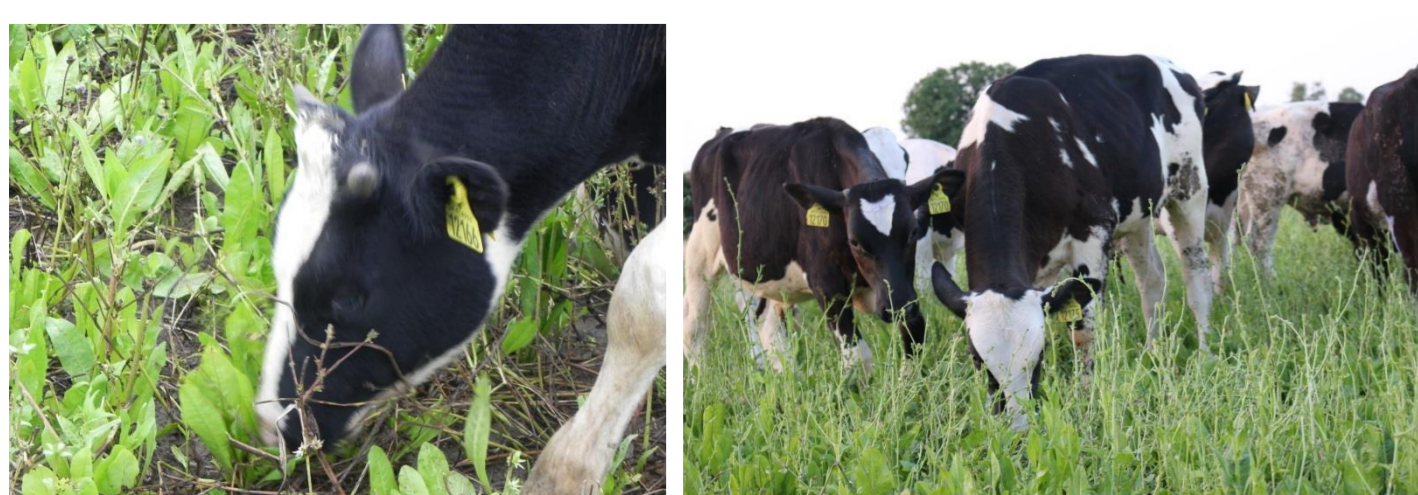
- 4-6 months-old calves were allocated into chicory (n=10) or control (n=10) groups and grazed pure-chicory or ryegrass/clover fields, resp., from start of study until slaughter

Study design:



*Infective dose: 20,000 *O. ostertagi* L3

- Faecal egg counts (FEC) were performed from D17 and calves were slaughtered at D36 for worm recovery



Chicory group (n=10)



Control (n=10)

Preliminary results:

- Estimated weight gains in chicory and control groups: 366 and 748 g/day, resp. ($P<0.001$)
- No differences in FEC between groups until D20
- From D22 onwards: significant FEC reduction in the chicory group ($P<0.05$)
- No differences in serum pepsinogen between groups
- Marked reduction in *O. ostertagi* adult counts in the chicory group

