

An investigation into factors affecting hoof shape, size and integrity in breeding rams



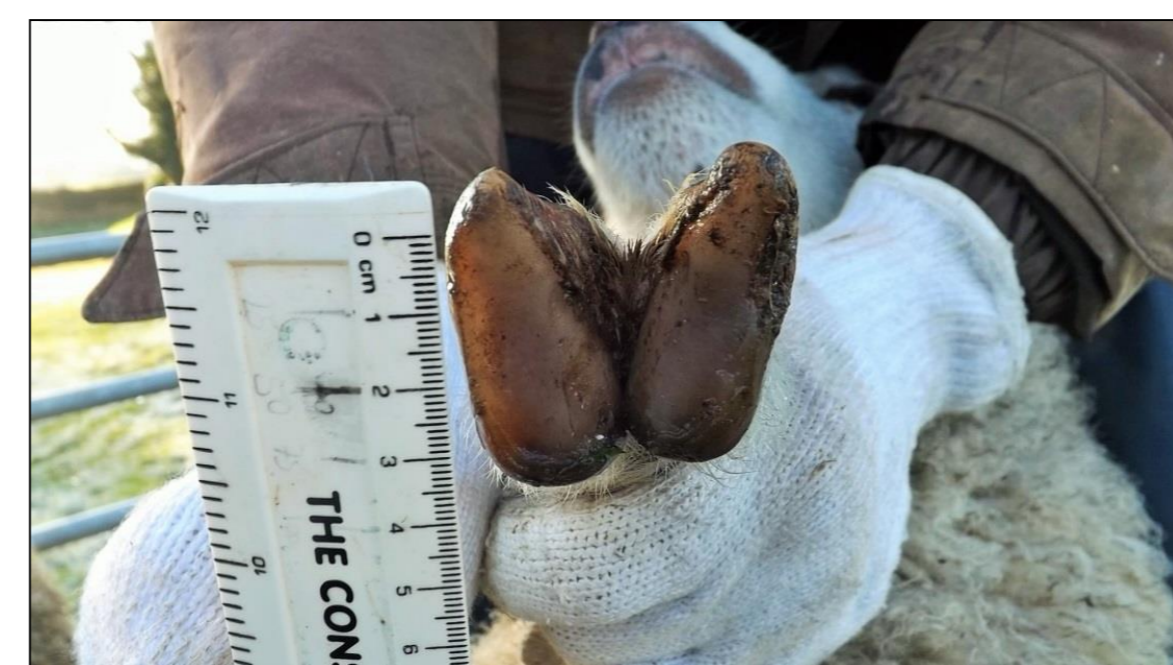
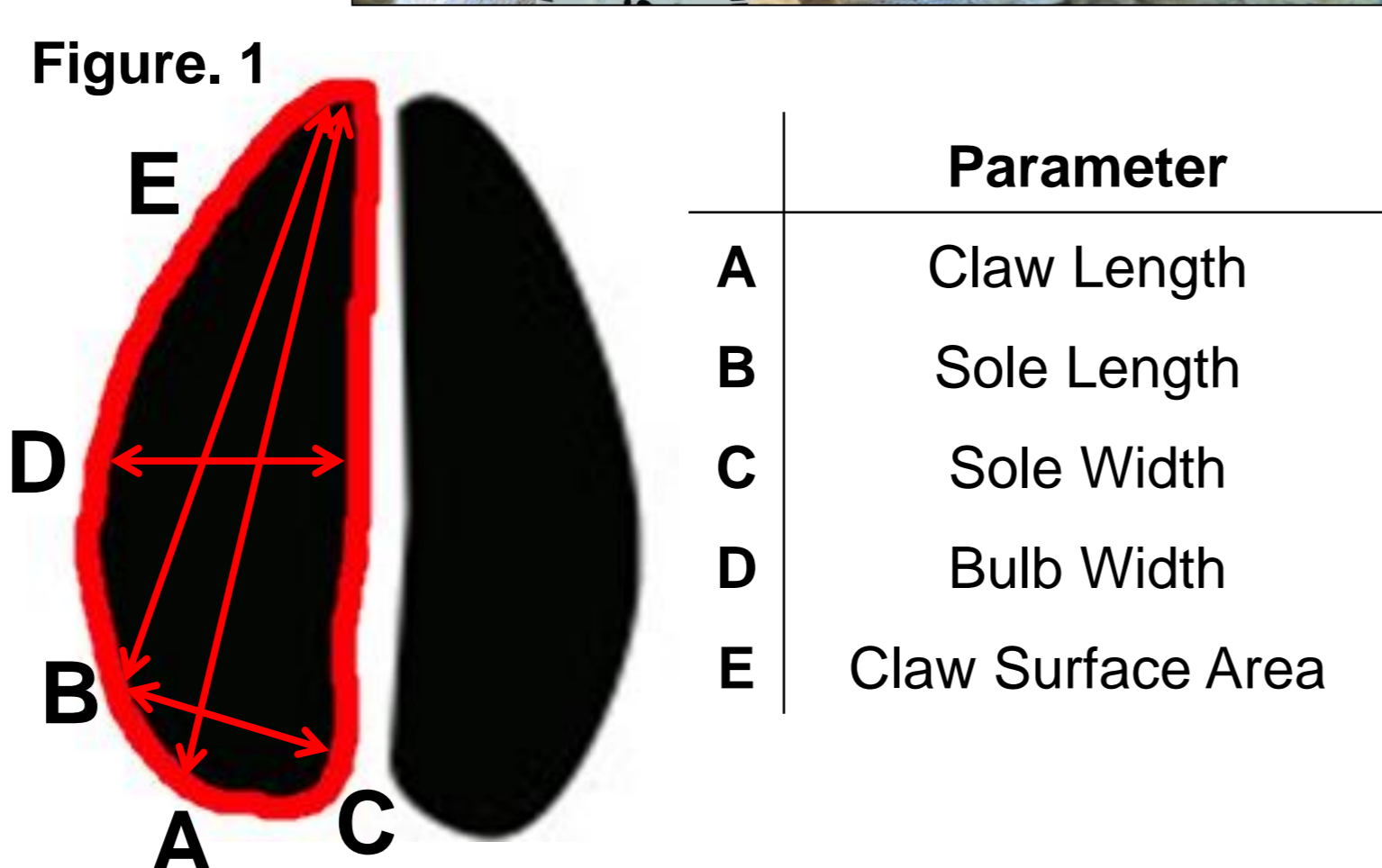
1. Background

- Hoof structure plays an important role in the aetiology of lameness
- Misshapen claws with poor integrity are at higher risk of bacterial penetration
- *Dichelobacter nodosus* infection can also damage the internal hoof structure, leading to long-term changes to hoof integrity
- Anecdotally, lameness in rams is one of the leading causes of early culling, alongside fertility and behavioural problems
- No studies have explicitly investigated the factors affecting hoof conformation



2. Methods

- Rams ($n = 51$) from five commercial flocks were studied at three time points across a 12-week period, spanning March to June 2017.
- At each visit, digital images of each hoof were taken.
- Body condition and locomotion also assessed.
- Using the digital images, all eight claws were analysed:
 - 1) Claw measurements (Fig. 1)
 - 2) Hoof conformation scores (Fig. 2)
- Intrinsic and extrinsic factors recorded:
 - 1) Ram age
 - 2) First tupping year
 - 3) Use of Footvax®
 - 4) Winter husbandry
 - 5) Routine trimming
 - 6) Age purchased
 - 7) Number of ewes per ram
- Statistical analysis performed on Genstat
- Unbalanced ANOVA was performed to investigate the effects of factors on mean measurements and scores



3. Results

- Lesion scores were positively associated with locomotion score in fore lateral claws
- Trend effect of first tupping year on lesion scores in fore medial claws
- Rams vaccinated with Footvax® had lower or improved total conformation scores in fore medial claws (Fig. 3)

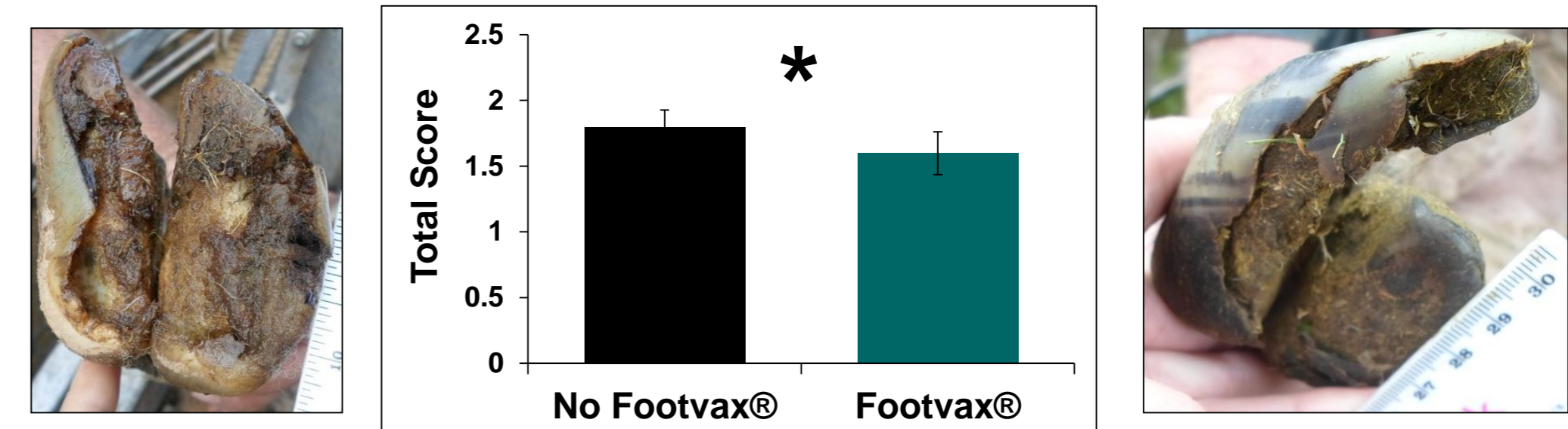


Figure 3. Lower total conformation score in rams vaccinated with Footvax®

- Rams housed indoors during the winter had lower wall conformation, lower locomotion scores, but greater wall overgrowth scores than those kept outdoors, in fore medial claws (Fig. 4)

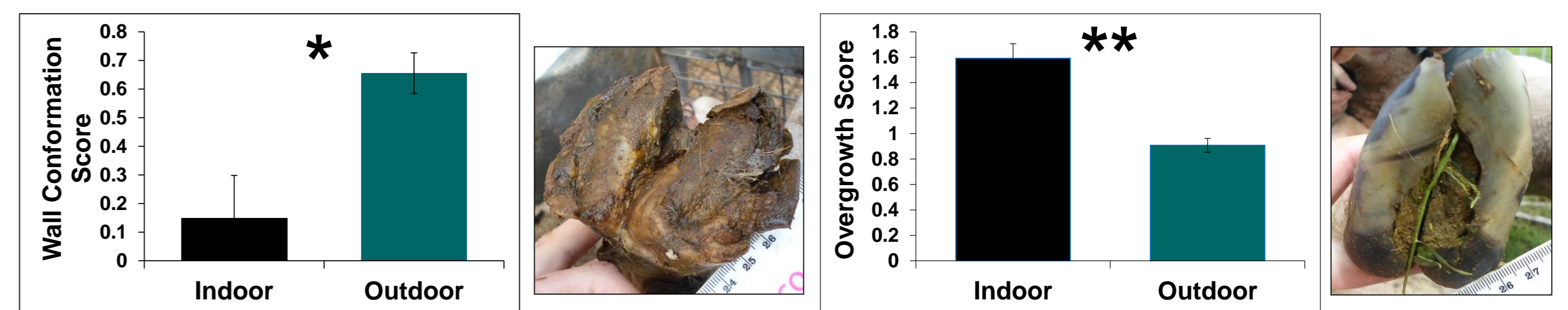


Figure 4. Lower wall conformation and greater overgrowth scores in rams housed indoors

- Rams routinely trimmed twice yearly had greater claw measurements than those never trimmed or those trimmed >twice yearly in fore medial claws (Fig. 5)

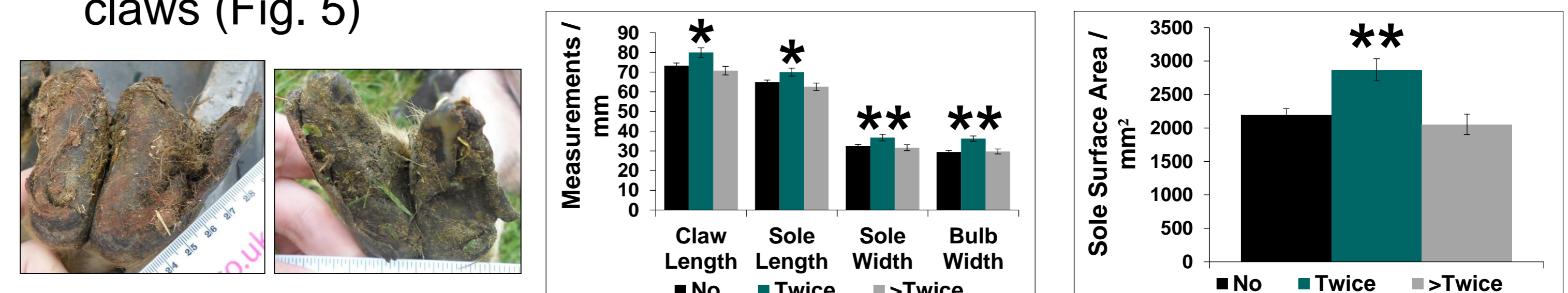


Figure 5. Greater claw measurements in rams trimmed twice yearly

- Rams routinely trimmed >twice yearly had greater total and lesion scores than those trimmed twice yearly or never (Fig. 6)

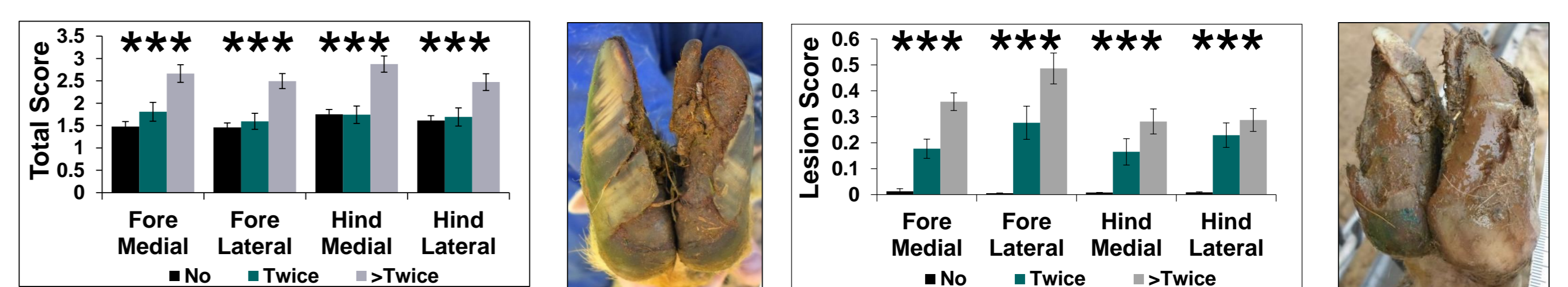


Figure 6. Greater total and lesion scores in rams trimmed twice yearly

- Rams purchased as shearlings had the greatest locomotion scores, compared to homebreds or when purchased as mature
- Rams serving more ewes had greater lesion scores, in fore medial and hind lateral claws

4. Conclusion

- Claw conformation affected by a range of extrinsic factors
- Environment is a significant factor affecting hoof integrity
- Frequent trimming leads to conformation changes and lesion risk
- Little effects observed in hoof measurements
- Hoof conformation could be incorporated into the Five-Point Plan

5. Future work

- Explore beneficial effects of Footvax® on conformation further
- Investigate farmers' perceptions on hoof conformation
- Determine the effect of hoof conformation on *D. nodosus* infection

Figure 2

Sole and heel of the digit

Undamaged sole and heel area with a perfect shape	0
Mildly damaged/misshapen sole and/or heel area (<25%)	1
Moderately damaged/misshapen sole and/or heel area (≥25% and ≤75%)	2
Severely damaged/misshapen sole and/or heel area (≥75%)	3

Wall of the digit

Undamaged wall hoof horn with a perfect shape	0
Mildly damaged/misshapen wall hoof horn (<25%)	1
Moderately damaged/misshapen wall hoof horn (≥25% and ≤75%)	2
Severely damaged/misshapen wall hoof horn (≥75%)	3

Wall overgrowth

<20% of wall overgrowing sole	1
≥25% but ≤75% of the sole covered by wall overgrowth	2
≥75% of the sole covered by wall overgrowth	3

Lesions

No under-running of the wall, heel or sole area	0
Under-running, separation, white line disease and/or lesions present	1