Mastitis Epidemiology in Commercial Dairy Herds of Upstate New York

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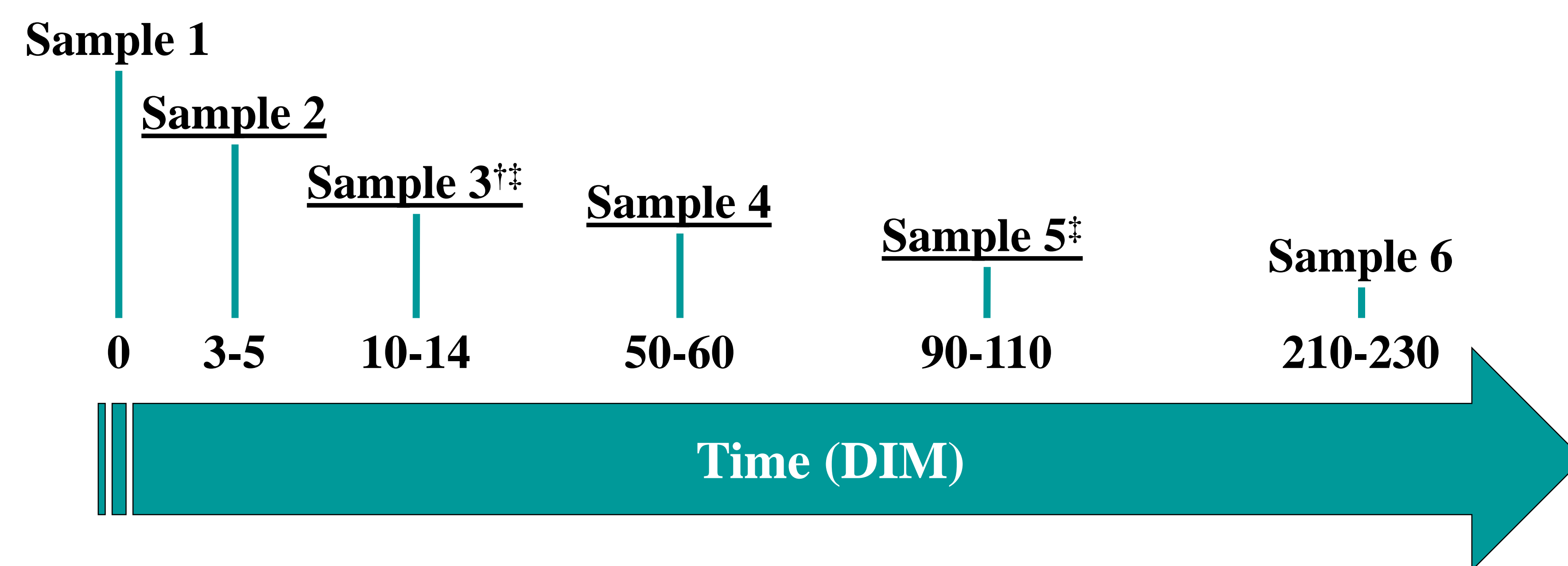[3]Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University

INTRODUCTION

- ❖ Mastitis can be characterized by inflammation of the mammary gland and udder tissue due to an induced immune response to bacterial infection
- ❖ Milk Somatic Cell Count (SCC) is a common diagnostic for mastitis cases
- ❖ Variation among cases can be attributed to both genetic and environmental effects
- ❖ It is difficult to assess the true prevalence of mastitis infection in U.S. dairy herds given the wide range of causes and large number of subclinical cases

STUDY DESIGN

Sample 1
Sample 2
Sample 3[†‡]
Sample 4
Sample 5[‡]
Sample 6

0   3-5   10-14   50-60   90-110   210-230

Time (DIM)

- ❖ 500 cows enrolled at 2 commercial farms in upstate NY
- ❖ Exclusion criteria: ¾ cow, non-pure bred Holstein
- ❖ Inclusion criteria: Sample 1 taken within 24 hours of parturition
- ❖ Milk samples and BCS collected at 6 time points for each cow
- ❖ Udder[†] and teat[‡] scoring performed for each cow

DISCUSSION & FUTURE DIRECTIONS

- ❖ Current Research
  - ❑ Epidemiology: mastitis prevalence, relative risk, and odds ratios associated with the described phenotypes
  - ❑ Microbiome: influence on observed epidemiological trends

- ❖ Future Research
  - ❑ Genetics: identify markers related to mastitis and use these markers to differentiate mastitis resistant or susceptible cows
    - ▪ Phenotypic assessment of mastitis (udder and teat characterization, SCC, clinical mastitis, microbiome)

- ❖ Analysis Considerations
  - ❑ Figure 2 was created using all cows in data set. To identify significant trends it will be appropriate to stratify animals by factors like lactation, parity, farm, production level, etc.

ACKNOWLEDGEMENTS

PRELIMINARY DATA

Fig. 1 — Mean Linear Score vs Lactation: 1 (n = 154), 2 (n = 177), 3 (n = 111), 4 (n = 57), 5 (n = 18), 6 (n = 7). Legend: 3-5 DIM, 10-14 DIM, 50-60 DIM, 90-110 DIM
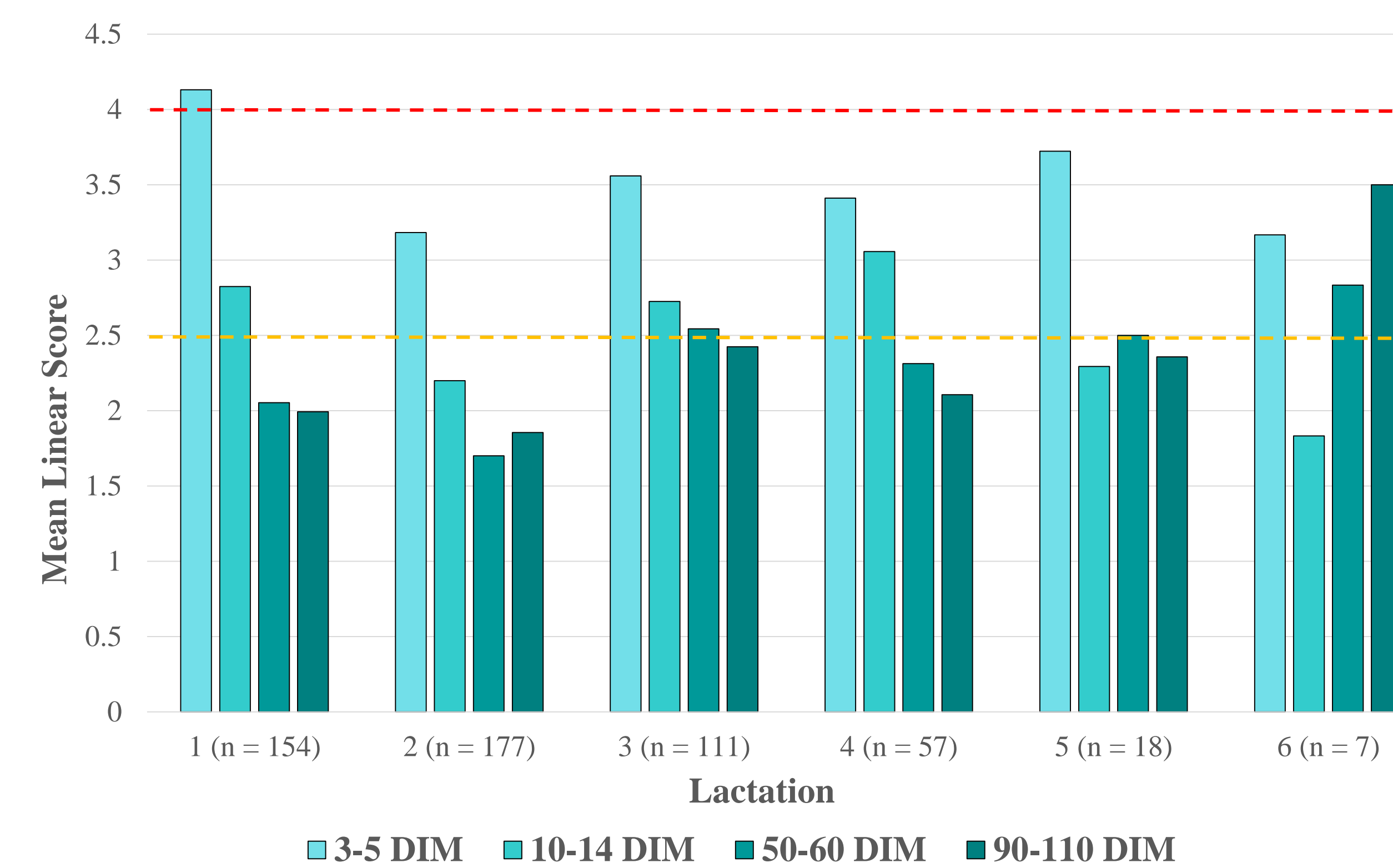
Table A

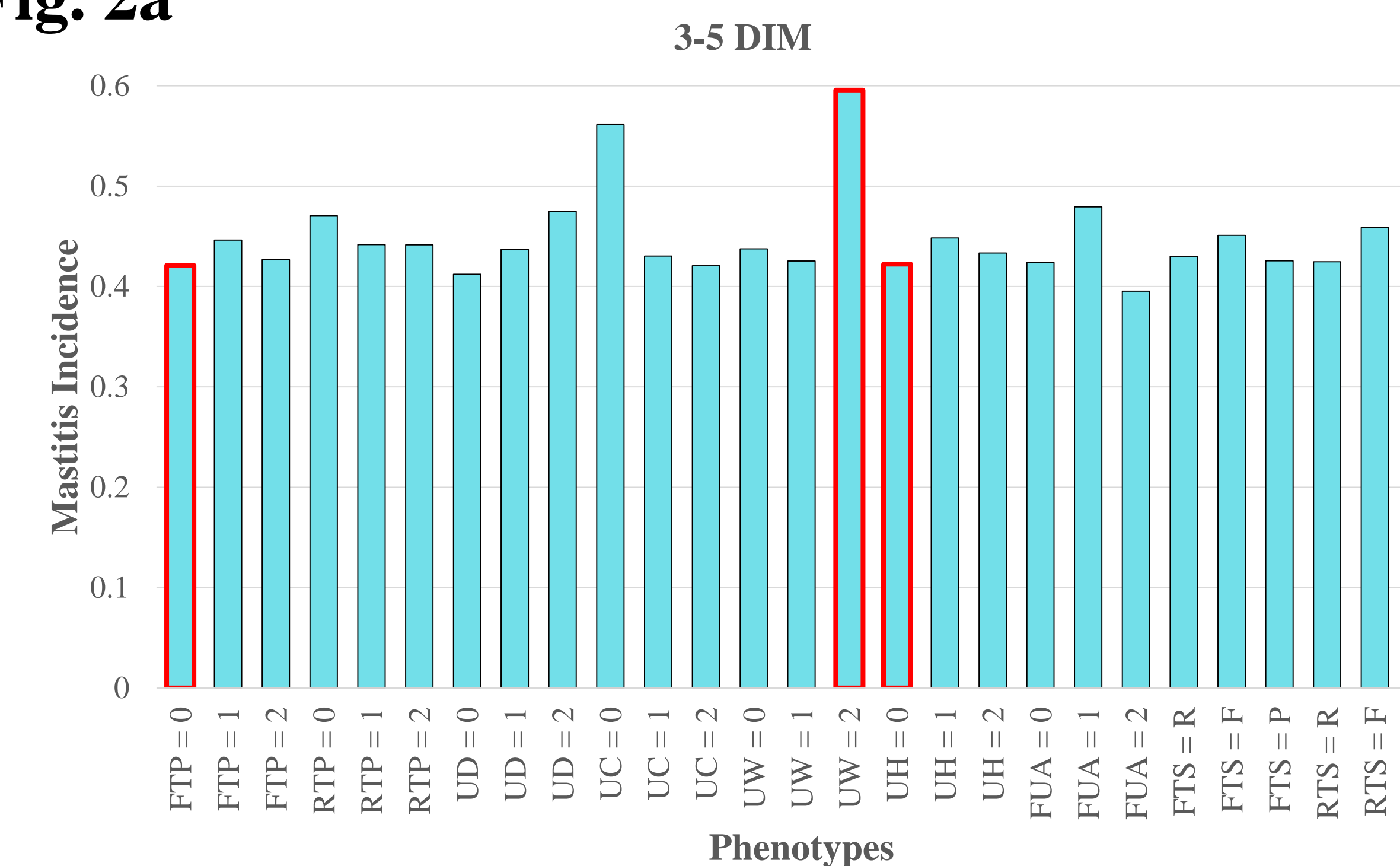| Abbrev.	Definition	Score
FTP/RTP	Front/Rear Teat Placement	0 – point laterally; 1 – point straight down; 2 – point medially
UD	Udder Depth	0 – udder floor below hocks; 1 – udder floor above hocks; 2 – udder floor extremely above hocks
UC	Udder Cleft	0 – flatter on udder floor; 1 – clearly defined halving; 2 – extremely deep cleft
UW	Rear Udder Width	0 – narrow at top of rear udder attachment; 1 – wide at top of rear udder attachment; 2 – extremely wide at top of attachment
UH	Rear Udder Height	0 – low or too close to hocks; 1 – intermediate; 2 – extremely high or too far from hocks
FUA	Fore Udder Attachment	0 – loose; 1 – intermediate strength; 2 – extremely strong
FTS/RTS	Front/Rear Teat Shape	R – round (Figure 3a); F – flat (Figure 3b); P – pointed (Figure 3c)

Fig. 3

Fig. 2a — 3-5 DIM (Mastitis Incidence vs Phenotypes)

Fig. 2b — 10-14 DIM (Mastitis Incidence vs Phenotypes)

Fig. 2c — 50-60 DIM (Mastitis Incidence vs Phenotypes)
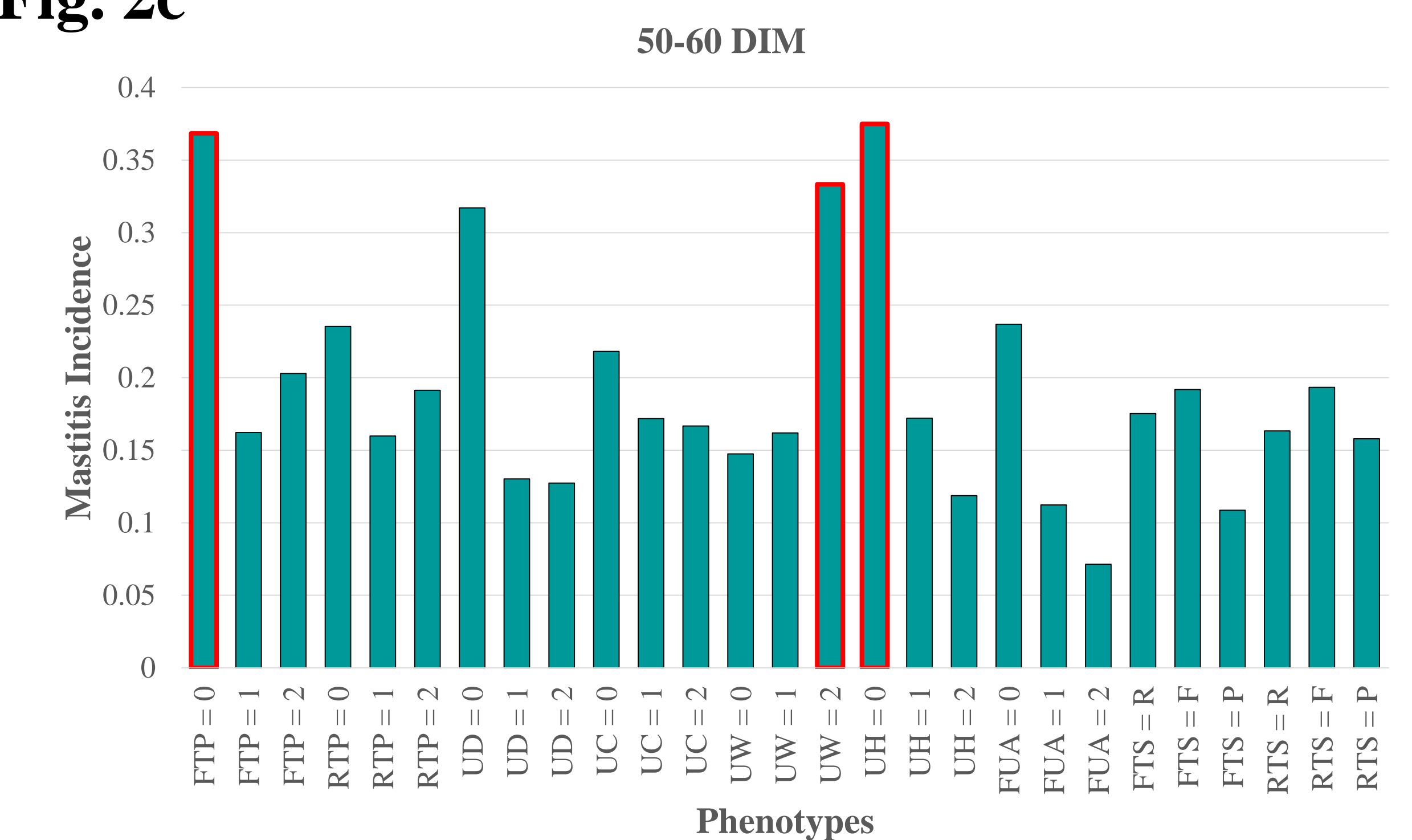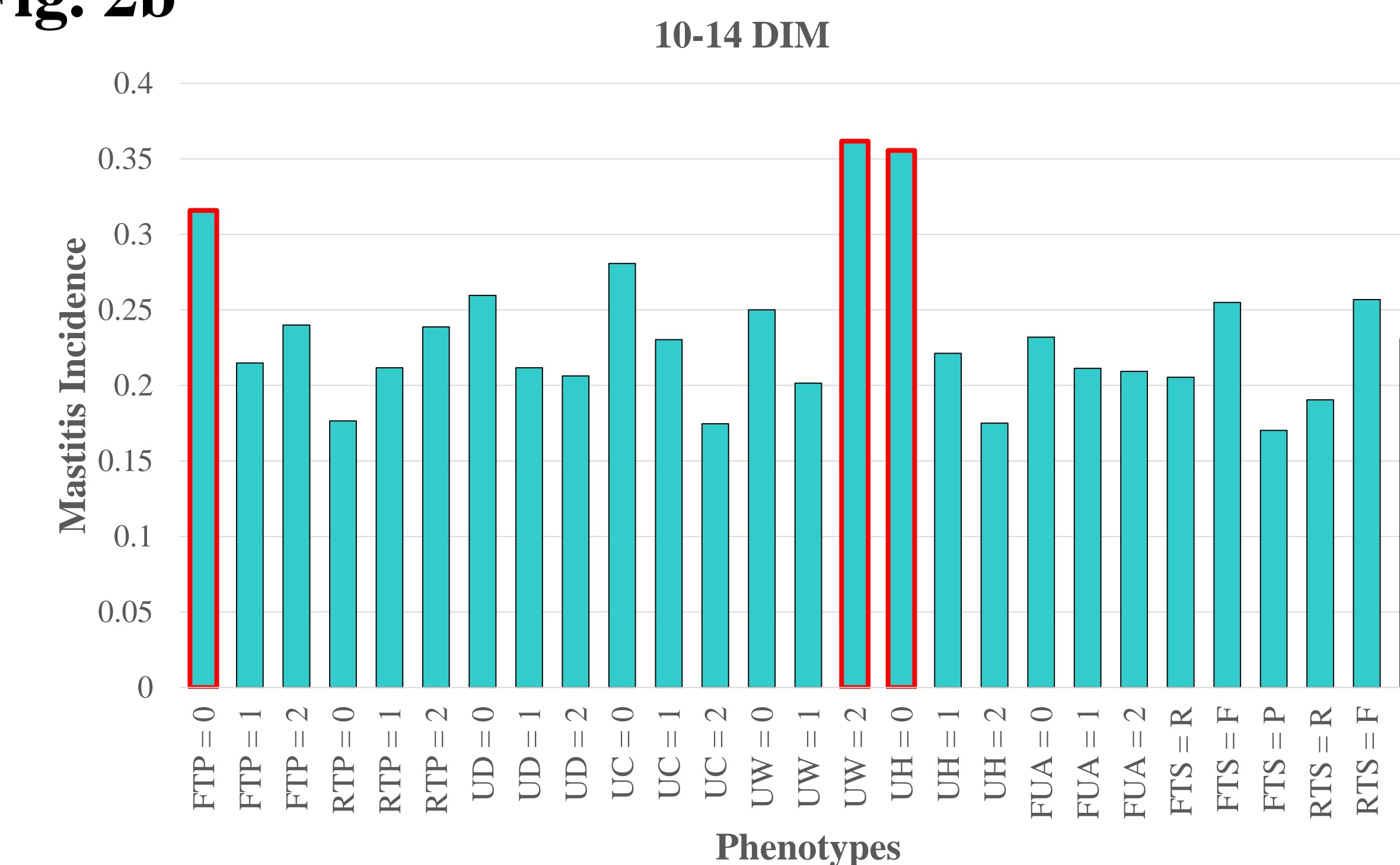
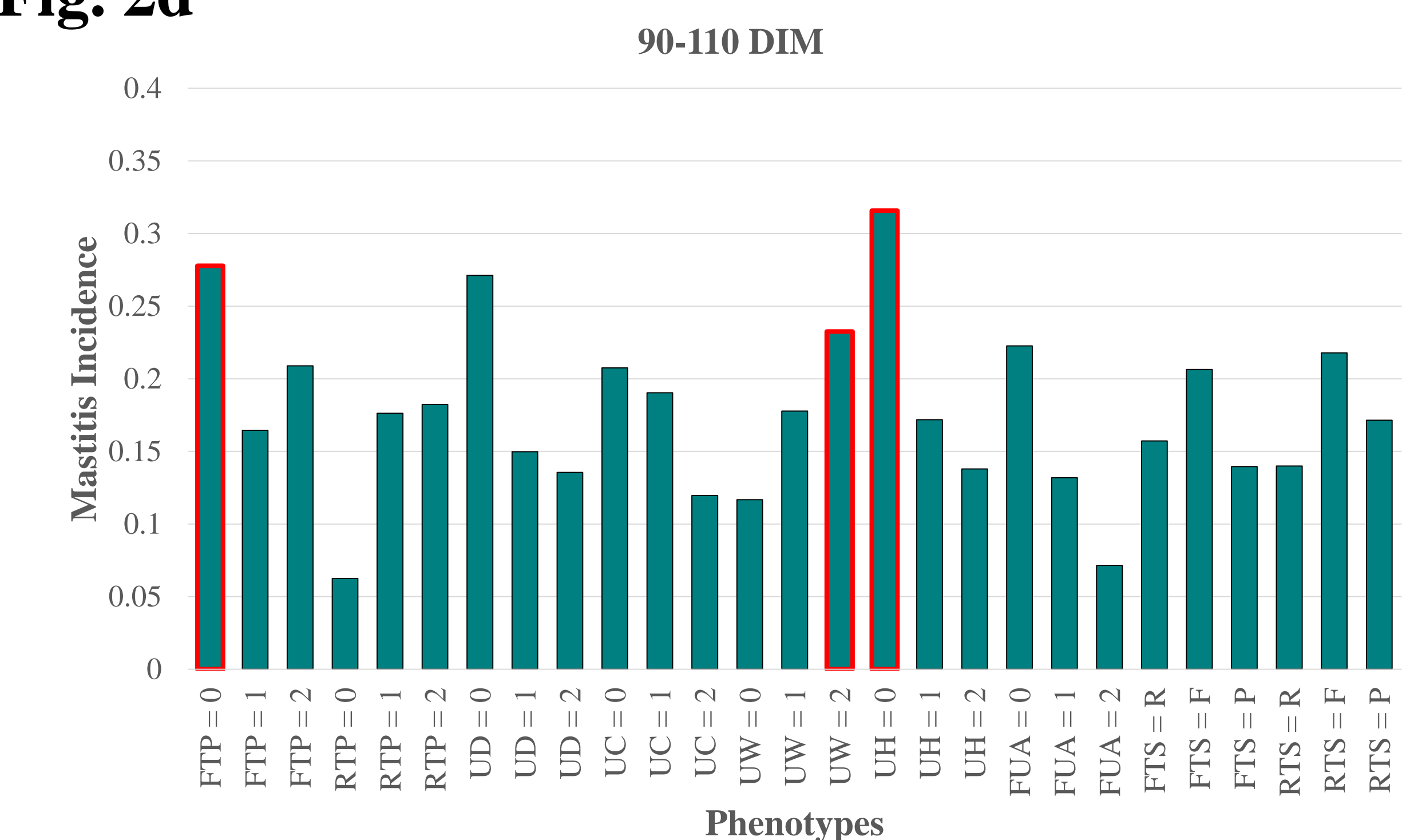Fig. 2d — 90-110 DIM (Mastitis Incidence vs Phenotypes)

Figure 1: Raw SCC data was converted to a linear score (LS) following DairyOne's standard for conversion, animals were stratified by lactation and mean LS at each time point was reported.

Figure 2: animals were stratified by specific phenotype and mastitis incidence calculated (case defined as LS ≥ 4) at a) 3-5 DIM, b) 10-14 DIM, c) 50-60 DIM, d) 90-110 DIM.

Figure 3: animals were scored based on teat end shape as a) flat, b) round, c) pointed.

Table A: the phenotypes abbreviated in Figure 2a-d are described.