Hunley Creek Heifer Farm

100 calves brought in on 9/28/2020 and 50 calves were lung scanned and weights were recorded

Average weight: 437 pounds

Initial Lung Scores:

- No lung damage (Score 1, 2, or 3): 76%
- Lung damage (Score 4, 5, or 6): 24%

Vaccination Weight (10/15/2020)

- Average Weight: 423 pounds
- ADG (9/28/2020 to 10/15/2020)
    - No lung damage: -0.37 pounds/day
    - Lung damage: -1.1 pounds/day
- 16 of the 38 calves without initial lung damage gained lung damage during this time period
    - Total percentage with lung damage as of 10/15/2020: 56%

Castration Weight (11/18/2020)

- Average Weight: 479 pounds
- ADG

Lung Status	ADG 10/15/20 to 11/18/20 (lbs./day)	ADG from 9/28/20 to 11/18/20 (lbs./day)
Lung damage prior to arrival	1.80	0.93
Lung damage after arrival	1.39	0.69
No lung damage	1.69	0.93

Overall Summary

- From the first weight (9/28/20) to the last weight (11/18/20) ADG
    - No lung damage: 0.90 pounds/day
    - Lung damage (score 4, 5, 6): 0.78 pounds/day
- Comparing ADG (first to last weight) of calves with a score 5 or 6 to other lung scores
    - No Lung damage: 0.99 pounds/day
    - Lung damage of 5 or 6: 0.31 pounds/day

- Calves who arrived with lung damage had a larger reduction in ADG after arrival compared to calves without lung damage; however, these calves adapted better to their new environment and ended with the same ADG as calves without lung damage. Calves who developed lung damage due to the transition period had lower ADG throughout the recorded time period.
  - From the analysis, calves who adapted lung damage after arrival were on average smaller on arrival (418 pounds compared to 444-pound average of calves without lung damage)
- Final Lung Scores
  - No Lung Damage: 40%
  - Lung Damage: 48%
  - Died: 12%

26 calves arrived on 12/2/2021 and were lung scanned on arrival with a 0% lung damage rate

- All 26 calves were housed in the same pen after arrival
- Upon the second scan, 7 of the 26 calves increased their lung score by 2 points (to at least a 3 in score)
  - When looking at the average weight of calves who had increased lung scans at the second scan versus not
    - Score 1 and 2 average weight at arrival: 569 pounds; 1.34 lb./day
    - Score of 3, 4, 5, 6: 460 pounds; 0.49 lb./day
  - This set of data again shows that calves who are smaller upon arrival are more susceptible to lung damage

Should background calves be scanned on arrival?

| Average Weight of Calf Group Brought In	% of Calves with lung damage on arrival
535	9.70%
437	24%
526	2.70%
536	0%
539	0%
508	0%
487	20%

- The average weight of background calves arriving on the farm was 509 pounds. The calf weights ranged from 300 pounds to 900 pounds, but the majority was in that 500 pound range. When the groups that were brought in were averaged separately, I noticed a trend on if they had lung damage or not. Smaller calves tended to have more lung damage upon arrival than the larger averaging groups, and to my surprise there were several groups that did not have any lung damage on arrival.
    - Due to this finding, lung scanning most groups of calves on arrival is not efficient or cost effective for the farm. Lung scanning also increases the amount of time each calf is in the chute, and lung scanning on arrival increases the stress level of calves.
    - The more effective and less time consuming/stressful way to sort animals on arrival would be by weight and not lung score unless the producer is bringing in a smaller weight averaging group of calves.
        - If calves' average weight at purchasing is below 500 then calves should be scanned and those who have lung damage on arrival should be treated.

Should lung scanning be incorporated into the beef backgrounding system at all?

- At Hunley Creek, calves are put through the chute system 2 to 3 times depending on if they are heifers or bulls at arrival (3 times if calves are bulls and need to be castrated).
- Would it be more beneficial to lung scan calves on the 2nd time through the chute instead of the first?
    - 50 calves arrived and scanned on 9/28/2020
        - 24% had lung damage at arrival
        - 58% of calves had lung damage when they were scanned for the second time, and lung damage increased by 34%
    - 26 calves arrive on 12/2/21
        - 0% had lung damage at arrival
        - 15% of calves had lung damage (>4) after the second lung scan with another 11.5% whose lung scored increase 2 points (lung score of 3)
    - 10 calves arrived on 12/10/2020
        - 0% had lung damage at arrival
        - 20% had lung damage after the second lung scan with another 20% whose lung score increased by 2 points.

    Lung damage does increase as calves arrive at Hunley Creek Heifer Farm; therefore, lung scanning at the 2nd time through the chute would be worth allocating the extra time to lung scan the calves. These calves will be treated with antibiotics decrease the lung damage and allow the animal to feel good enough to eat

- Through lung scanning at Lindauer Dairy Farm, I have confirmed that lung damage can be healed over time if treated with antibiotics in a timely manner.
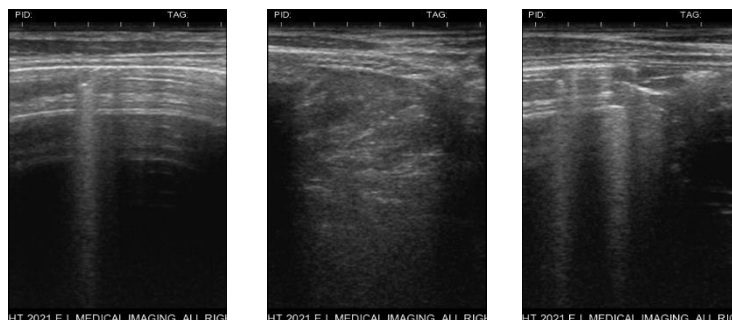
- Picture one shows a lung score of 3 which was take on the first week, the 2nd week the calf had a score of 6, and was treated with antibiotic, and the third picture is a score of 4

- How many weeks after should background calves be put through the chute to lung scan for the 2nd time?
  - I did not have the opportunity to scan enough calves to pinpoint the exact week the majority of lung damage would show on the ultrasound machine. Based on my research with the dairy farms, I believe the most optimum time for this would be two weeks after arrival.
    - Calves were scanned anywhere from 5 to 1 week after arrival. The second scan was based on how the calves were eating, looking, and if we were having a lot of sick ones. Because we put them through the chute and vaccinate during this second scan, we waited to put them through until the majority were doing well and when we had time on the farm.