

Automatic Calf Feeding Systems-Producer Surveys

Introduction

Iowa State University Extension & Outreach conducted a survey in 2013 of producers who utilized an automatic calf feeder system (ACF) on their farm. Twenty producers responded to the survey. The average installation was 2.6 years old. The herds averaged 367 cows; two operations utilized ACFs for bull calves only. The average cost per ACF was \$17,301 with software costs included. Two were purchased used with an average price of \$5,500. Monthly costs associated with the ACF, excluding milk replacer costs, averaged \$55/month. Additional costs included construction of new group housing or adaptation of existing structures to accommodate the feeders. Existing structures remodeled for the ACF included parlor/holding pen, hoop barn, existing building addition, and farrowing house. Average building cost associated with the ACF was \$66,643.

Facility Management

Forty-seven percent of the farms used straw for bedding. Ten percent of the farms did not use any bedding as calves were housed on a raised grated floor; remainder of the farms used a combination of straw, sawdust, and cornstalk bedding. Cleaning out group pens varied from every one to two weeks, to every couple of months depending on stocking density. Farms provided an average of 34 square feet per calf.

Ventilation to minimize accumulation of moisture while not causing a draft on the calves is essential and can drive the success or failure of the ACF. Previous facilities included wooden huts, condos, and individual stalls inside a calf barn where natural ventilation was the primary air flow. New and existing structures utilized a combination of curtain sidewalls and fans for summer ventilation and positive pressure tubes for winter ventilation; two farms utilized a cross-ventilated system.

Automatic calf feeding systems were cleaned frequently with an automatic circuit clean programmed 2-3 times a day and manually cleaning in between. Farms ranged in cleaning nipples and lines from daily to weekly. Lines and nipples were replaced as needed or every four to six weeks. Cleaning solutions included a low acid dilution, soap, bleach and water, or purchased disinfectants.

Colostrum Management

Seventy-one and eighty-two percent of farms administered colostrum within 2 hours after birth when the calf was born between 5-11 am and 11 am – 5 pm. Between 11 pm – 5 am, 5% percent of calves received colostrum within 2 hours, 61% at 2-6 hours and 38% at 6-12 hours after birth. Seventy-eight percent of farms administered 1 gallon or more of colostrum at their first feeding. Sixty-seven percent of farms primarily fed fresh colostrum, 56% occasionally fed frozen colostrum or replacer, and 26% always fed colostrum replacer. Five percent of farms fed pasteurized colostrum.

Eighteen percent evaluated colostrum prior to feeding either visually or use of a colostrometer. Twenty-five percent periodically measured the success of passive transfer of immunity with a refractometer or serum test.

Feeding Management

Before the ACF, all producers fed two times per day with buckets or bottles. Forty-one percent of producers fed a total of 4 quarts per day, while 29% fed 5 or greater quarts per day before the ACF. For calves to consume their total daily intake in the ACF, calves averaged 4-6 meals per day. If the calf did not consume all of the milk during a meal, milk was retained for the next calf. If milk fell below feeding temperature, milk was discarded before next calf could consume it. Feeding programs varied depending on the system and if heifers or bulls were fed. Calves were fed between 140-150 grams of powder per liter and fed up to 10 liters per day. The last two weeks prior to weaning, liters fed was gradually backed down until they no longer received milk. Eighty-five percent were feeding milk replacer. Fifty-six percent were feeding protein content in the milk replacer between 20-22% and 38% were feeding protein content in the milk replacer between 25-28%. Twenty-five percent utilized pasteurized waste milk with the ACF.

Calf starter was offered free-choice to calves starting at Day 0-2 (39%) and Day 3-10 (44%). Calf starter was replaced as needed daily to weekly to keep it fresh. Seventy-three percent of producers had calves consuming between 3-5 pounds of calf starter at weaning age, while 13% reported calves eating greater than 5 pounds of calf starter at weaning age. Forty-four percent used a calf starter protein of 16-20% and 56% of producers fed 21-22% calf starter protein.

Water was offered free-choice to calves, starting at day 0-2 (59%), day 3-10 (35%), and day 11-14 (6%).

Labor Management

Twenty-five percent of herd owners took care of calves, while 31% hired a calf manager, 19% herds person, and 25% family members. If they were not the primary calf manager, other duties on the farm included general farm labor to overall management of farm. On average, time spent feeding calves was 2.2 hours per day. This time included feeding, monitoring, vaccinating, dehorning, bedding and sanitation. Time spent feeding, managing, and caring for calves transitioning to the ACF averaged 1 hour. Producers commented no labor time was saved; time was more flexible and the labor was replaced with management time. Others reported an average reduced labor by 1.5 hours per day, which allowed time to be more flexible and focus on other management factors. Utilizing the software is a key element to the ACF, but did not take much time to review the data. Producers' usage of the software averaged .44 hours.

Health Management

Twenty-two percent fed colostrum and moved into group housing at birth. Thirty-three percent fed calves for 2-5 days prior to group housing. Forty-four percent of calves started on the ACF between 1-2 weeks of age. Sixty-nine percent used age for determining when to move calves to automatic calf feeder, while 31% used health of calf and 46% used consumption as an indicator to move to group housing.

Sixty-four percent of farms used bodyweights as the main measurement to evaluate calf performance. Mortality and morbidity rates are often used along with management records. Average mortality rate was 3%. Treatment for scours was 14% and respiratory treatment rate was 14%. Scour and respiratory treatment protocol included a combination electrolyte therapy with an antibiotic treatment and fever reducer.

Indicators used on the software to determine calf health included drinking speed and daily consumption of milk. Ninety-four percent responded that the feeder showed alarms for calves not consuming total allotment, while 6% were not alerted. Thirty-seven percent have monitored average daily gain and averaged 2.3 pounds per day from birth to weaning. Average weaning age for heifers was 8 weeks and bull calves were 7 weeks old.

If calves were vaccinated at birth, vaccines included Rota Corona, Clostridium C&D, E.Coli, Inforce 3, Bovine Ecolizer C. Within a few weeks of age, vaccines included Johnes, Scour Boss 4, Inforce 3. At the time of weaning, vaccines included Presponse, Bovishield, and Johnes. For dehorning, 50% used the paste within a week of age; the remainder dehorned in group pen with a burner prior to weaning or a few weeks after weaning.

| | Average | Range | Notes |
|---|--------------|-------------------|-------------------|
| Annual Value to Quality of Life | \$6,800 | \$100-\$15,000 | |
| Annual Value of ACF software | \$1,300 | \$1,000-\$2,000 | |
| Months since ACF installed | 31.6 | 11 to 60 mos. | |
| | | | |
| Herd & Financial Assumptions | | | |
| Herd Size | 367 | 170-880 | |
| Number of heifers fed yearly | 146 | 0-375 | |
| Number of bulls fed yearly | 179 | 0-1,250 | |
| Cost per ACF | \$17,302 | \$1,800-\$28,000 | Used avg (\$5500) |
| Cost of ACF facilities | \$66,643 | \$1,000-\$240,000 | |
| Monthly costs associated with ACF | \$55 | \$30-\$100 | |
| | | | |
| Labor Management | | | |
| Labor for calves transitioning to ACF | 1 hr. | 0-2 hrs. | |
| Labor for calves in ACF | 2.2 hrs. | 0.5-8 hrs. | |
| Reduced hours of labor | 1.5 hrs. | 0-4 hrs. | |
| Increased hours for records Mgt. | 0.44 hr. | 0-1 hr. | |
| | | | |
| Calf Health & Management | | | |
| Square feet per calf | 34 sq. ft | 13-63 sq. ft | |
| Calves per nipple station | 21 | 15-27 | |
| Mortality | 3% | 1%-10% | |
| Morbidity (Scours) | 14% | 0-80% | |
| Morbidity (Respiratory) | 14% | 0-50% | |
| Average Daily Gain | 2.3 lbs./day | 1.25-3.5 lbs./day | |
| Weaning Age-heifers | 56 days | 45-77 days | |
| Weaning Age-bulls | 49 days | 49 days | |

Challenges with Automatic Calf Feeder

Main challenges encountered with the ACF included learning the software and ID system, developing a feeding plan to control behavioral issues, and mechanical issues such as an occasional plug or sensor not working, replacing a small pump yearly, keeping system clean, and compatibility issues with pasteurizer system. Respiratory and facility ventilation were main challenges of moving calves to a group housing system.

Reasons for installing Automatic Calf Feeding System

The top reasons producers installed ACF in rank order:

1. Labor efficiency

Focus labor more on management of calves rather than physical labor and flexibility of feeding schedule

2. Calf health

Consistent, multiple feedings, temperature of milk always the same, increase space per calf, calf comfort

3. New facility

Going to build anyways, needed more room, installed AMS for cows, and needed new project to challenge employees

Management factors needed for success of Automatic Calf Feeder system

The top management factors producers say key to success:

1. Cleanliness

Detail oriented employees closely monitoring and cleaning of the lines, nipples, circuit, and cleanliness of calves

2. Ventilation

Facility is designed with air quality being a key component of the system

3. Management/Software

Software is invaluable, pays for itself, and worth the cost to catch sick calves earlier; watching calves is still important

Summary

Producer surveys showed success in switching from previous calf feeding systems to ACF systems. Although labor was not always reduced, physical labor was exchanged for management labor. Learning curves for software technology and facility management were noted, however feeding and housing efficiencies were gained. In sum, automatic calf feeders added value to quality of life and labor efficiency over previous system.

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