Issues in managing group fed calves.

Bob James
Dept. of Dairy Science

VirginiaTech
Invent the Future

Traditional calf rearing

- Individual housing
  - Isolation
  - Control of feeding program
  - Limit feeding – 1 gallon = 1 lb. of solids
    - Early weaning – 6 weeks
    - Less risk of "diarrhea".
    - Cheaper
  - Lack of maternal care?
  - Social development – group housing after weaning?
    - Limited space/calf.

VirginiaTech
Invent the Future

Group Housing

- Group housing
  - Less fear of other calves, novel environments
  - More social activity and development of social skills
- Recognize – Dr. Margit Bak Jensen – Arrhus University

VirginiaTech
Invent the Future

Important components of managing calves in groups.

- Colostrum management
  - Quality
    - Brix - >22 or better
    - Low bacteria count - <100,000 spc
      - Feed within 1 hour of milking or cool
  - Quantity - >100 g of IgG = 4 quarts first 12 h
  - Quick – as soon as possible.

VirginiaTech Invent the Future

Initial management?

- Hutches or individual pens for ??? days.
- Depends on calf
  - Colostrum?
  - Strong eater?
- Varies from 3 – 14 days of age.
- Why?

VirginiaTech Invent the Future

Milk feeding method

Labor efficient, Loss of control of intake by individual calves
Sanitation ??
New Zealand – Seasonal calving?

VirginiaTech Invent the Future

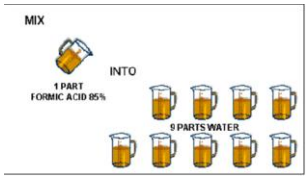
Free choice milk

VirginiaTech Invent the Future

Cross sucking

VirginiaTech Invent the Future

Free choice acidified milk



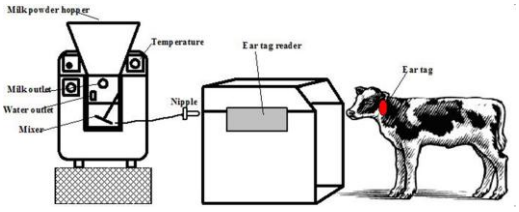
http://www.omafra.gov.on.ca/english/livestock/dairy/facts/mimick.htm

Dangerous compound at 85% level – care in handling

Higher intake – 8 – 12 quarts / calf / day

VirginiaTech Invent the Future

Principles of calf autofeeders



Biotic industries, Bell Buckle, TN

Computer controlled feeders

Biotic Industries
Bell Buckle, TN

Computer controlled

Forster Technik, Germany
Delaval, GEA

Forster Technik


Additional computer controlled feeders

- Urban
- Holm Laue
- Lely
- Others?

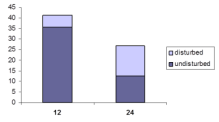
Age at introduction to group

- Day 6 compared to Day 14?
  - More restless 1st day after introduction - Rasmussen et al, 2006)
  - Needed more guidance to feeder (Jensen, 2008)
- 50% less risk of respiratory disease if wait to 14 d (Svensson and Liberg, 2006)

Picture – Jensen - 2009

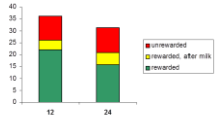
Important concepts of group feeding.

Calves per feed station



More calves / feeder =
More competition

Calves per feed station



More calves = increased
Rate of intake

Jensen, 2004

VirginiaTech
Invent the Future

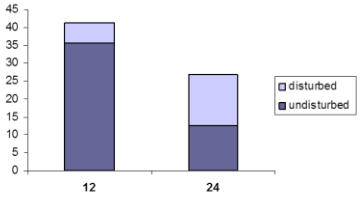
Calves per feeder?

- Manufacturers recommend 20 – 25 per station
- Most herds we surveyed had less than 20/feeder
- Difference in two systems.

VirginiaTech
Invent the Future

Calves per feeder

Min. / calf / 24 h

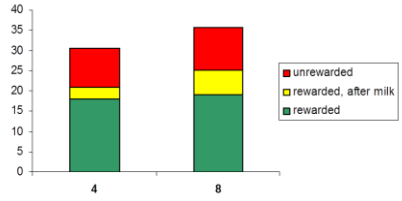


More calves per feeder = more competition and disturbance

VirginiaTech
Invent the Future

Milk portions per day.

Min. / calf / 24 h



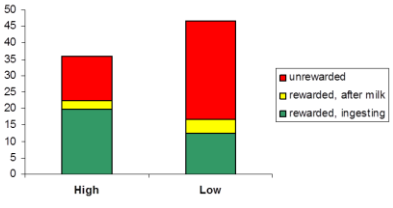
- More portions/ day = more occupation after feeding
- Limits cross sucking
- Depends on stocking rate and total fed.

(Jensen, 2004)

VirginiaTech Invent the Future

Milk allowance per calf

Min. / calf / 24 h



Lower milk allowance = more time in feeder
More unrewarded visits.

VirginiaTech Invent the Future

Virginia Tech Research

Machado and James, 2011

- 10 dairies in VA and NC identified with feeders.
  - Survey of management
  - Measure: Temperature, SPC, Brix refractometer to estimate solids.
  - 6 farms visited monthly between June and September

VirginiaTech Invent the Future

Management practices

- Age when started on autofeeder – 2 – 14 days
- Training calves to feeder
- Milk replacer used – 20:20 – 28:20

Dairy	Herd size	Management strategy	Feeder type	# calves/ feeder	Milk replacer
1	280	Technology	Sophisticated	20	25:20
2	400	Technology	Basic	16-21	24:18
3	3,100	Additional method	Basic	20	20:20
4	900	Additional method	Basic	15-19	22:18
5	220	Labor	Sophisticated	12-35	20:20
6	250	Labor	Basic	11-20	28:20
7	190	Labor	Basic	25	28:20
8	500	Feeding rates	Sophisticated	25	20:20
9	1,300	Feeding rates	Basic	17	22:20
10	125	n/a	Basic	20	20:20

Management strategies

- **<u>Technological advancement</u>: purchased feeders more than 2 years ago and have made technological advancements in other areas on the dairy**
- **<u>Additional method</u>: fed calves individually but used the autofeeders as alternative method of feeding an abundant number of calves which exceeded current individual housing facilities**

Management strategies

- **Refocused labor: intention to reassign labor management from time demand of preparing and feeding milk to the care, sanitation, and well-being of calves**
- **Feeding rates: represented producers who purchased automated feeders to manipulate feeding rates -- gradually increase milk intake until peak, at a higher rate than conventional feeding, followed by soft weaning**

Data collection

- **Duplicate milk replacer samples at the time of the survey**
  - **Sanitation of the autofeeder (SPC)**
  - **Temperature of the milk replacer liquid**
  - **Refractometer to estimate solids?????**

Brix refractometer can monitor changes within feed type

Mean standard plate count (10^5), temperature (°C), and refractometer (Brix) reading by machine type

Machine type	Variable	N	Mean	SD	Minimum	Maximum
Basic	SPC	89	69.25	73.71	0.00	500.00
	Brix	35	12.00	2.10	7.00	18.00
	Temperature	31	38.8	6.72	87	118
Sophisticated	SPC	44	13.39	22.03	0.00	88.00
	Brix	15	10.37	1.68	7.00	13.00
	Temperature	14	38.5	6.76	81	107

**note: Brix refractometer reads 2% less than total solids??

Category	Variable	N	Mean	SD	Minimum	Maximum
Technology	SPC	18	25.94	17.04	0.00	67.00
	Brix	5	10.10	2.84	7.00	12.50
	Temperature	4	37.2	4.77	93	103
Additional calves	SPC	18	63.17	45.42	8.00	181.00
	Brix	8	10.31	1.22	9.00	13.00
	Temperature	7	39.2	5.62	95	110
Refocused labor	SPC	12	8.33	16.96	0.00	54.00
	Brix	5	12.00	1.97	9.50	14.00
	Temperature	3	39.0	2.80	99	104
Feeding rates	SPC	77	48.66	44.30	0.00	187.00
	Brix	30	11.88	2.09	7.00	18.00
	Temperature	29	39.3	6.64	87	118

VirginiaTech Invent the Future

- There is no goal for SPC for milk replacer.
  - Bacteria should be less than 20,000 cfu/ml in pasteurized waste milk
- These averages were all well over 100,000 cfu/ml
- Calf liquid diets should be fed at a range of 100-105°C
- Averages were within feeding guidelines >> the minimum (81°F) and maximums (118C) indicated a lack of accuracy in several systems
  - These temperature extremes could cause cold stress or decrease milk intake. MR doesn't dissolve well at lower temperatures.

VirginiaTech Invent the Future

Summary

- Of the autofeeders studied, Biotic (basic) more than Förester-Technik (sophisticated) machines, appear to require greater attention and maintenance
- Producers with the assumption that calves can be fed and left alone were not satisfied with the autofeeder – additional method

VirginiaTech Invent the Future

Before considering the system

- Nutritional benefits
  - Mimics the dam – more frequent feeding – better feed utilization
- Colostrum management
- Receiving area management
- Data oriented – check intakes daily
- Monitor the system – temperatures, Brix?
- Sanitation

VirginiaTech Invent the Future

Summary

- **The data from this study indicates the need to conduct further studies evaluating autofeeder sanitation, consistency, and calf performance**
- **Future research could help develop benchmarks to encourage improved sanitation and consistency of milk delivered to calves on autofeeders**

VirginiaTech Invent the Future