WHY KEEP CALVES IN GROUPS? Behavioural and welfare aspects.

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Because

1. They gain weight faster
2. They eat more grain
3. Their health is as good as in individual housing
4. Cross-sucking is not a problem
5. Their social needs are met
6. Their learning is improved

Also: How to control defecation/urination?
Early Pair Housing

Calves housed:
  a. Individually from birth
  b. Pair housed from day 6 after birth
  c. Pair housed from day 43 after birth

Feeding: 8 L/d of whole milk
  Calf starter *ad lib* from day 1
  Weaned gradually between d50 and d55

Costa et al. 2015. J. Dairy Sci. 98:6381
Early pair housing improves weight gains

Average daily gain to week 10 (kg / d)

- Individual: 0.76 kg/d
- Pair housed from day 6: 0.89 kg/d
- Pair housed from day 43: 0.73 kg/d

Costa et al. 2015. J. Dairy Sci. 98:6381
Early pair housing improves starter intake

Average daily starter intake (kg/d)

- Individual:
  - Pre-wean: 0.70 kg/d
  - Post-wean: 1.26 kg/d

- Pair housed from day 6:
  - Pre-wean: 0.18 kg/d
  - Post-wean: 2.20 kg/d

- Pair housed from day 43:
  - Pre-wean: 0.05 kg/d
  - Post-wean: 1.09 kg/d

Costa et al. 2015. J. Dairy Sci. 98:6381
Pair housing improves calves’ learning and social abilities

Calves housed:
a. Individually from birth
b. Pair housed from day 6 after birth

Feeding: 8 L/d of whole milk
    Calf starter *ad lib*
Weaned gradually between d50 and d55
*Mixed into groups of 6 calves on d56*

De Paula Vieira et al. 2010. J. Dairy Sci. 93:3079
Pair housing helps calves *LEARN* to use grain feeders

Time to first use feeder and number of visits to feeder for 14 days after mixing

- **Individual**: 49.5 h
- **Pair housed**: 9.1 h

Pair housing improves weight gain after mixing into groups

Daily gain on day 2 and day 3 after mixing

-2.4 kg (Individual) and 0.5 kg (Pair housed) on day 2
-0.9 kg (Individual) and 0.9 kg (Pair housed) on day 3

De Paula Vieira et al. 2010. J. Dairy Sci. 93:3079
Early pair housing (before 6 d of age):

- Improves intake of solid feed
- Improves weight gain
- Improves calves’ learning abilities and preparedness to live in groups
Housing calves outdoors in pairs
Q: Why do some calves cross suck?

One of the concerns about pair or group housing is controlling cross suckling between calves.
Sucking motivation: natural history and motivating factors

1. Calves nurse to survive and bond with their dam
2. Taste of milk (especially lactose) stimulates sucking
3. Cross-sucking occurs around milk delivery and is infrequent after weaning off milk
4. Sucking a teat satisfies sucking motivation
-Liquid placed in calf’s mouth
-calf sucks a dry teat
Increasing milk concentration on sucking duration

RM = reconstituted milk
Base contains lactose + minerals etc.

RM+RM
RM+RM-base
RM+Lactose

sucking duration (min)

RM
RM+RM
RM+RM-base
RM+Lactose

p = .004
If calves can suck a teat after milk meals, cross-sucking is reduced.

% observations of cross-sucking

P<0.05

NO TEAT  WITH TEAT
Q: Why do some calves cross-suck allow cross sucking?

After weaning, 75% of cross-sucking is on a “preferred” calf. Often mutual cross-sucking

Vaughan et al., 2016
Take home message

When calves drink a large amount of milk via a teat only a few cross-suck for more than 1-2 minutes a day.

After weaning this is usually due to mutual cross-sucking on a preferred partner.

No evidence that this increases the risk of mastitis
The importance of feeding calves large amounts of milk or replacer

- High pre-weaning weight gain are associated with high first lactation milk production
- Calves show signs of hunger when fed the traditional 4 – 6 L/d
- Selection of cows for high milk production has resulted in calves with a large appetite?
Even very young calves drink large amounts of milk but there are large differences between calves.

Milk intake
L/d

Day 2
6L/d
4L/d

Day 4
14
12
10
8
6
4
2
0

14
12
10
8
6
4
2
0
Calves that become sick from day 10 – day 28 drank less milk during the 4 days after birth

Requirement: Calves must receive a volume...of milk or milk replacer to maintain health, growth and vigour

Recommended best practice: provide whole milk or milk replacer to calves ad libitum

offer calves a minimum of 20% of body weight
Group housing with an automated feeder facilitates feeding larger amounts of milk
Many problems are associated with dirty environment...
Alison Vaughan

PhD
“Practical applications of the learning abilities of cattle”
30kg feces

15kg urine

Per day!
Accumulation of urine and feces

- Preparation time at milking
- Clinical mastitis
- Lameness
- Disease transmission
- Risk of slips and falls
- Cow comfort
- Air quality
Manure management
Why not toilet train cows?
Operant conditioning

1. Training

Each calf had a yoked control saline.

Calf given a diuretic.

When the calf urinated, it was released and given a milk reward.
Upon urination:
• Next day was another test day

No urination:
• Next day was a training day

Operant conditioning

2. Testing

No diuretic
Overview

Training day → Testing day

Did calf urinate?

Yes → No → Training day

No → Yes → Testing day
Trained calves urinated more often in the stall than the yoked controls.

Frequency of urinations

- Trained: 5
- Controls: 2
Calves can learn to urinate in one place

- **Training is rapid** but would be too much work for producers
- So, we have been exploring tools to train calves automatically
- If some can’t learn, perhaps those are the heifers that are sold
- Needs more research
- Would totally change housing and management
Smart camera to detect shape of calf ID animal and detect urination/defecation.
Training calves to use a colour cue to locate food
Teaching calves to use colour to predict outcomes

● I will show you 2 videos:

1) calf comes in to test area having seen the + color = colour predicting there is milk in the teat

2) Calf comes into area where it sees the – colour = color predicting no milk in teat
Rewarded situation: calf response
Unrewarded situation: calf response