Group feeding of lactating dairy cattle

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http://dairymgt.info/cluster/clustering.php

Rationale

- Every single cow in a herd has a different nutritional requirement

- Less productive animals are normally overfed to assure enough nutrients for the most productive animals

- Having groups of cows fed different diets would improve profitability and decrease environmental impacts

Strategies of Grouping

- Decision depends on:

- Individual cow's nutrient requirements
- Number of lactating animals
- Facilities and equipment
- Management and labor availability

A Proposed Approach

- 1. Get the Farm Data
  - Monthly test dataset containing:
    - Cow ID
    - Parity
    - Days in milk (DIM)
    - Milk production
    - Milk fat content
    - Body Weight (BW, <u>optional</u>)

2. Cow's Nutritional Requirement

- In function of: Parity, DIM, milk, fat, BW

- Net Energy (NE) for maintenance
- Net Energy for production
- Crude Protein (CP) for maintenance
- Crude Protein for production
- Dry Matter Intake (DMI)

3. Nutritional Requirements of a Group

- 83rd percentile (mean + 1 SD) of the CP and NE
- If the average cow in a group requires:
  - **1.5 Mcal and 15% CP**
- And the SD deviation of the group is:
  - **0.2 Mcal and 1.5% CP**
- Then the requirement for the group will be:
  - **1.7 Mcal and 16.5% CP**

4. Determine Number of Groups

- Previous research and empirical results indicate that is not worthwhile to do more than 4 lactating groups

- It may also be not practical or feasible to do more than 4 lactating groups in commercial herds

- Number of lactating cow groups: 1, 2, 3, or 4

5. Criteria for Grouping

- Days after calving or DIM

- Fat corrected milk (FCM)

- Merit = $FCM/BW^{0.75}$

- Cluster= Uses Mcal and CP requirement combined

Mcal

Crude Protein
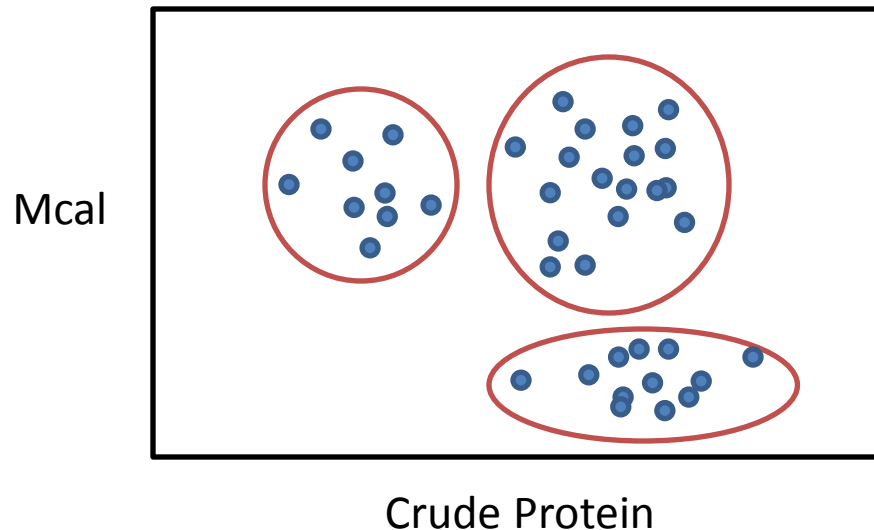
6. Optimize Cows Inside a Group

- Goal = Maximum IOFC (income over feed cost)
- Price of Milk, Mcal, and CP
- Price per Mcal and pound of CP can be estimated from *referee* feeds such as corn and soybean meal (SBM)
- Including/excluding a cow in a group affects the Mcal and CP requirements, the production of the group and therefore the IOFC

7. Assess Other Costs or Grouping

- Cost of additional management when
- Additional labor required
- Estimate of *milk depression* because of social interactions
  - Amount of milk depression
  - Number of days until recover

Compare the Net Return of Grouping Strategies

- ## Farmer can't do more groups
  - ### Still an opportunity to use a better criterion fro grouping

- ## Farmer can do more groups
  - ### Select the right number of groups
  - ### Select the right group criterion
  - ### Optimize the number and type of animals in groups

Compare the Net Return of Grouping Strategies

- Farmer does not group and can do groups
  - Test the additional net return of doing 2, 3, or 4 groups
  - Select the right group criterion
  - Optimize the number and type of animals in each group