Calculation of the lactation performance from daily milk recording data

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Farmers using technical equipment

Number of farms using herd management software
(Eastern Germany)

- Nearly all big farms are using herd management software (HMS)
- Milk recording organisations get
  - Test day records
  - Reproduction records
  - Animal movement infromation (I&R)

  directly from the farms (HMS) covering 82.5 % of all dairy cows
- Why not using daily milk recording data?

Demands from the practice

- Using daily milk records for
  - Lactation performance for milk yield
  - Lactation performance for fat and protein yield
  - Consideration of additional information on milk yields in genetic evaluation
  - Impact of varying length of testing intervals

Daily milk recording data

Results of a study using farm computer data

- Data
  - 31 herds with daily milk recording data from 9 regions in Germany
  - 4,149 cows
  - 4,474 cows x lactation
  - Considered DIM: 1 to 600
  - 365,349 daily milk milkings (730,698 single milkings)
  - 32,187 daily milkings with information on contents of both a.m and p.m. milkings as well as the mixed sample from the a.m. and p.m. milking

(Bünger et. al, 2004)

Daily milk recording data

Results of a study using farm computer data

- Results
  - Quality of daily milk recording data was rather poor, e.g.
    - Only 20 % of all cows had daily records without missing.
    - Cows were not identified clearly.
    - Dry cows with milking yields.
    - Technical problems on the farms with data processing (e.g. compatibility of programs).
  - Reliable data must be guaranteed before it can be used by milk recording organisations
  - Methods for calculating the lactation performance were proposed

(Bünger et. al, 2004)

Preparation of the milk recording future

German Cattle Association (ADR)

- The German milk recording organisations decided to use daily milk recording data for the calculation of lactation performance.
- Authorization of the ADR working group „Implementation of Milk Recording“
  - Formulation of a regulation for milk recording scheme „daily“
    - Minimum farm and software requirements
    - Method of identifying the test day performance
    - Method of calculating the lactation performance
  - (Basis: regulation for milk recording at automatic milking systems)

Content

- Demands for implementing daily milk recording data using automatically stored single milk weights on a farm
- Identifying the test day performance of each cow
- Identifying and using the single milk weights of each cow
- Calculating the lactation performance of each cow
- Publishing the results (test day, lactation performance)

Demands for using daily milk weights

Farm
- Basis of the automatic daily milk weight collection are electronic milk meters installed in milking parlour
  - Approved by ICAR
  - Checked by the milk recording organisation every year
- A farm software solution
  - Saving all single milk weights of each cow between the actual test day and the test day before
  - Submitting all single milk weights to the IT centre
  - Transferring the data using standard transfer formats

Milk recording organisation
- Approving that a farm meets all requirements of daily milk recording
- Admitting the farms for daily milk recording

Identifying the milk performance

At the test day
- Milk yield (kg), milk content (sample bottles)

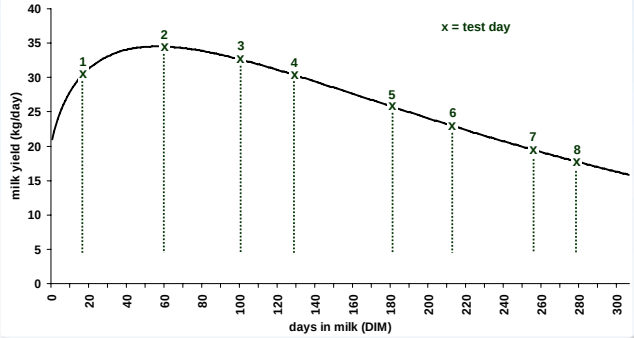
Between the test days
- Determination of an average 24 hour milk yield, calculated from all „acceptable“ single milk weights
  - Definition of an „unacceptable single milk weight“:
    - A record is deficient
    - A record is missing
  - Minimum requirements to the number of single milk weights that are used to calculate the average 24 hour milk yield
    - 85 % of the theoretically possible single milk weight numbers (→ ICAR guidelines)

Calculation of the lactation performance

- Lactation performance has to be calculated in the data centre
- Using the calculated average 24 h milk yield (24MY)

Automatic Milking Systems (German Method)

Lactation curve and test days: Calculation of the lactation milk performance



Automatic Milking Systems (German Method)

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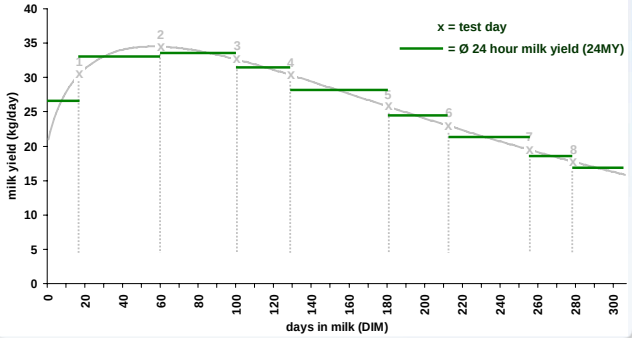

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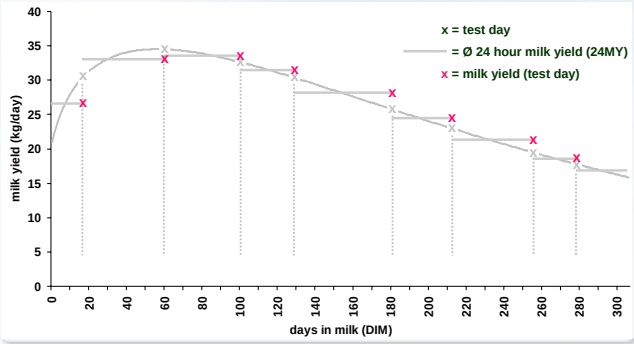

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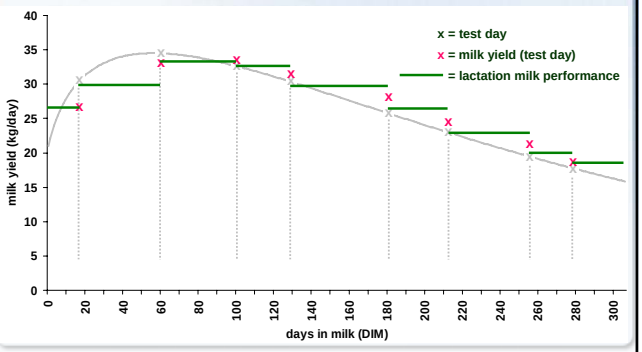
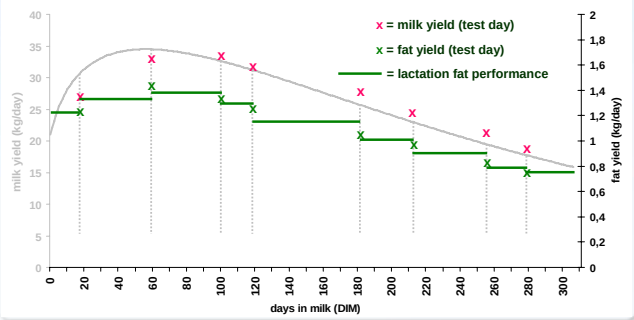


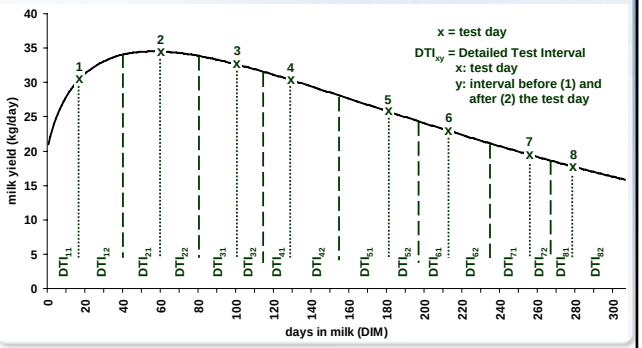
Automatic Milking Systems (German Method)

Lactation curve and test days: Calculation of the lactation fat performance



Daily Milk Recording (DTI Method)

Lactation curve and test days: Calculation of the lactation milk performance



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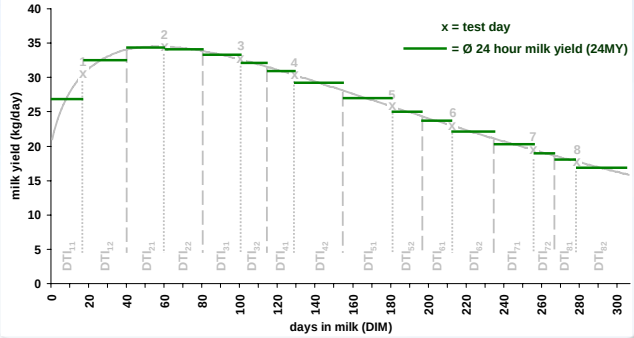


Daily Milk Recording (DTI Method)

Interpolation method for calculating lactation milk performance

- Interval between recording dates (in days):

  $I_{x1} = 0.5 \times [(\text{test day})_x - (\text{test day})_{x-1}]$

  $I_{x2} = 0.5 \times [(\text{test day})_{x+1} - (\text{test day})_x]$

- Average 24 hour milk yield: 24YM

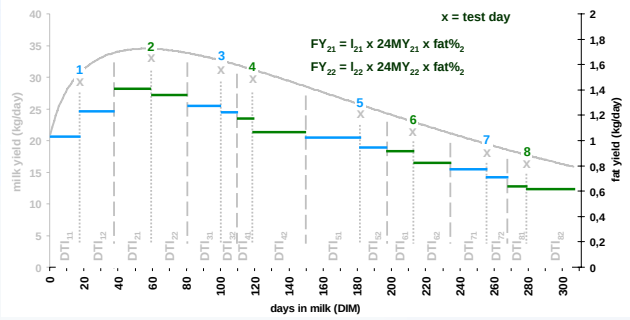
- Milk yield

  $MY = \sum_{i=1}^{n} \sum_{y=1}^{2} (I_{xy} \times 24MY_{xy})$

  where x = test day (1, 2, ..., n),
  y = interval before (y=1) or after (y=2) the test day

Daily Milk Recording (DTI Method)

Lactation curve and test days: Calculation of the lactation fat performance



Daily Milk Recording (DTI Method)

Interpolation method for calculating lactation fat performance

- Fat yield

$$FY = \sum_{i=1}^{n} \sum_{y=1}^{2} (I_{xy} \times 24MY_{xy} \times fat\%_x)$$

where x = test day (1, 2, ..., n),
y = interval before (y=1) and after (y=2) the test day

- Fat percent

$$FP = 100 \times FY / MY$$

Publishing the results

Results of the test day
- Milk yield of the test day
- Milk fat and protein content

Lactation performance
- MY: using the 24MY of each DTI
- FY: 24MY x content

→ Differences between
- MY: test day vs. lactation performance
- Milk content (FY, PY): test day vs. lactation performance

Conclusion

- The DTI method
  - follows more or less the standard test interval method
  - is a practicable and flexible way to process data
  - is a complicate, but more exact way to calculate the lactation performance
  - is a valid way to use daily milk recording data
  - is introduced in Germany
- German guideline for daily milk recording
  - Farm requirements
  - Requirements to the data quality
  - Calculating the lactation performance via DTI method
  - Reliable calculation method by using the test day records if the data quality of single milk weights is rather poor
  - Publishing the results

Thank you for your attention!

http://www.vit.de

Farmers using technical equipment

Number of dairy farms using VIT PC or internet solutions

year	# milk recording farms	# farms using VIT PC data / internet services	% of all farms
1995	34,200	2,142	6.2
1997	32,400	2,822	8.7
1999	29,600	3,560	12.0
2001	25,477	4,055	15.9
2003	24,233	4,460	18.4
2005	22,545	4,729	21.0

(VIT year books 1996 – 2006)

PC data service: number of herd management PC software (Eastern Germany) or data preparation for PC software (Western Germany)

Internet service: VIT internet herd management service netRind (www.netrind.de)