



Technical Session 4: Future Daily Yield Calculations for Cattle

Global 24-Hour Calculation trends in
Classical Milk Recording Systems

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- **Dairy Cattle Milk Recording Working Group**
 - Update and improve Section 2 of ICAR Guidelines
- **24-hour calculations**
 - Classical Milk Recording and Automatic Milking Systems
- **Analyse situation in Milk Recording Organisations**
 - ➔ From a SURVEY to know needs and expectations
- **Establish a future policy and recommendations**
 - Harmonising of practise in world wide
- **Benchmarking for organisations**



- **90 questions about 24-hour calculation**
 - Defined and validated
- **Several sections**
 - Practical experiences with ICAR methods
 - Problem areas, priorities and needs
 - Processes used to estimate coefficients and factors
 - Types of statistical indicators used
- **Two mains parts**
 - Classical Milk Recording Systems & Automatic Milking Systems



- **Participants**
- **Practical experiences on 24-hour ICAR methods**
 - Delorenzo and Wiggans, 1986
 - Liu and al, 2000
 - Hand and al, 2006
- **Other methods used**
- **Calculation of factors and coefficients**
 - Collecting of data
 - Statistical method



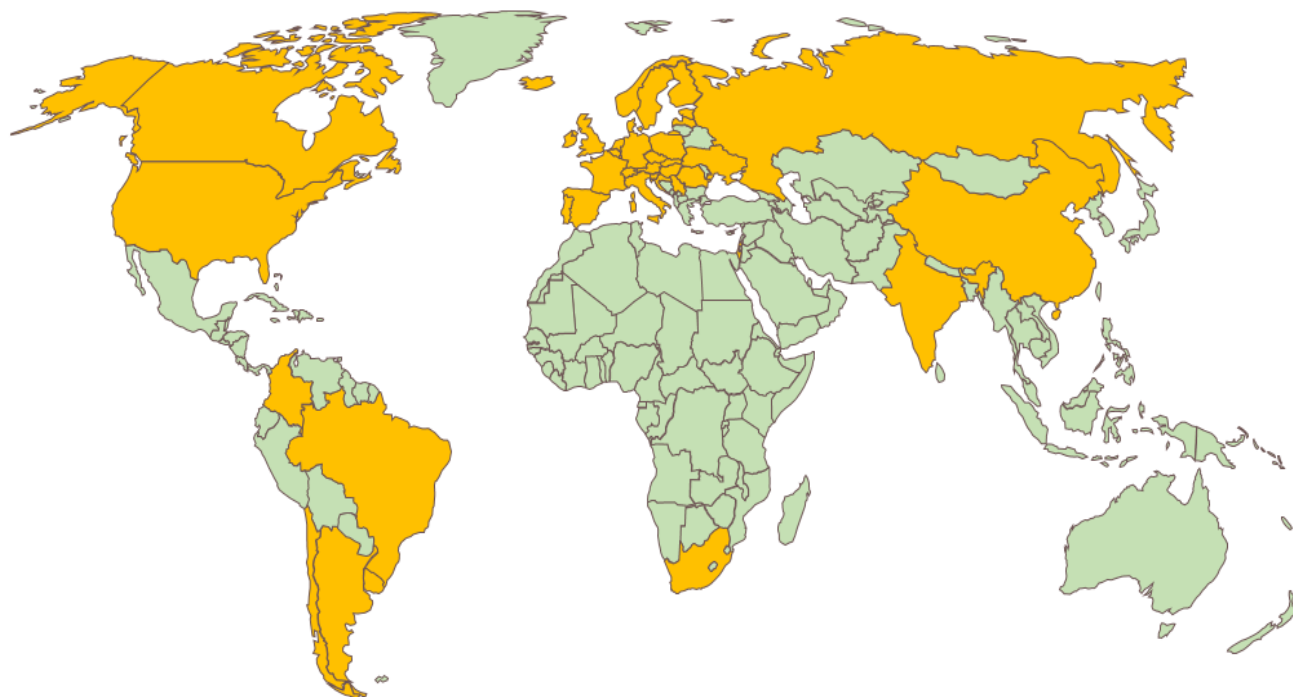
What are the results and trends on Classical Milk Recording Systems?





Data from 52 organisations in the world!

Participants



World map by www.freeworldmaps.net

20th June - ICAR Conference 2019 - Prague

Participants



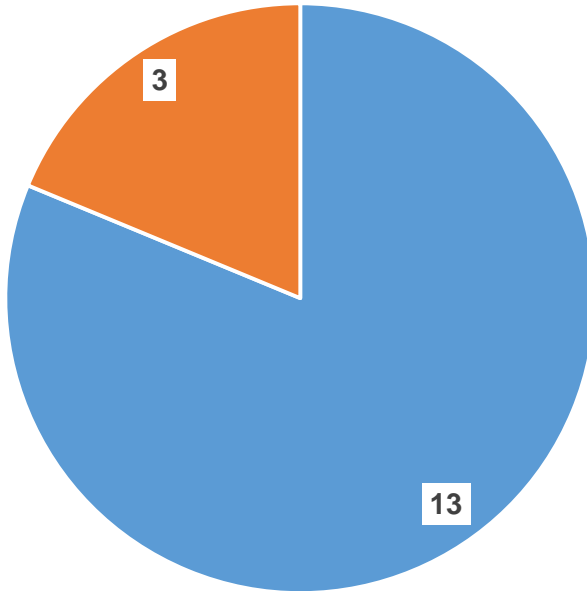
Many thanks to the members of organisations!

Friedrich Reinhardt, Kai Kuwan, Juho Kyntäjä, Danuta Radzio, Yaniv Lavon, Bruce Dokkebakken, Carlos Trejo, Kevin Haase, Franz Josef Auer, Filippo Miglior, Antonio Martins, Julio Carvalheira, Richard Cantin, Tone Roalkvam, Guðmundur Jóhannesson, Nils-Erik Larsson, Dianová Marta, Filippo Rapaioli, Fernando Sotelo, Jere High, David Hambrook, Armand Braun, Eric Barras, Uffe Lauritsen, Veronique Frappreau, Sofia Alday, Claudio Napolis Costa, José Augusto Horst, Galina Fedorova, Olga Kachanova, René van der Linde, Brian Coughlan, Gillon Alain, Mauro Fioretti, R L Bhagat, A B Pande, Mario Séguin, Marija Klopčič, Erna Galvanovska, Daina Lodina, Angie Coburn, ACHA, Árpád Kenéz, María Jesús, Bularca Ioan Raul, Janette Mathie, Zdenko Ivkic, Jianbin Li50, Aire Pentjärv, Biljana Perisic, Nilesh Nayee, R O Gupta, Steven Sievert, Seamus Gilheany, An Pengpeng, Sun Xianzhi, Japie van der Westhuizen, Volodymyr Tytenko, Augier Gabriel, Lecomte Christophe, Carlos Lizana, Pavla Rosincinova, Robert Fourdraine, László Dégen, Samuel Pinto, Glorieux Gery, Rotar Mircea Catalin, Dena Snidall



Do you use this method?

Number of organisations



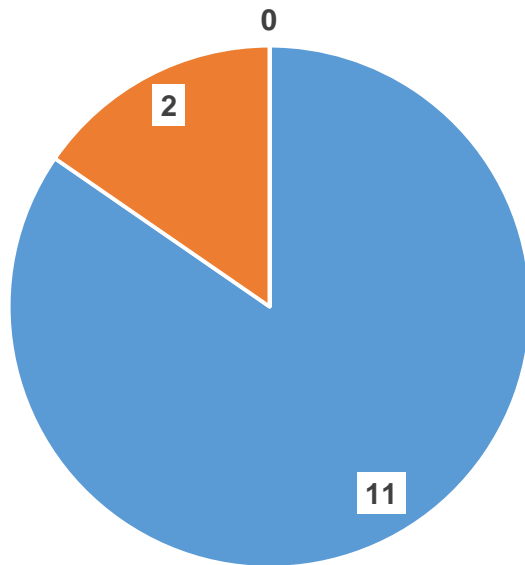
■ Yes ■ Yes, but with some adaptations or changes

- Method simple
- Easy to understand
- Practical to use
- Factors and coefficients published in ICAR Guidelines



What's the origin of the factors you use?

Number of organisations

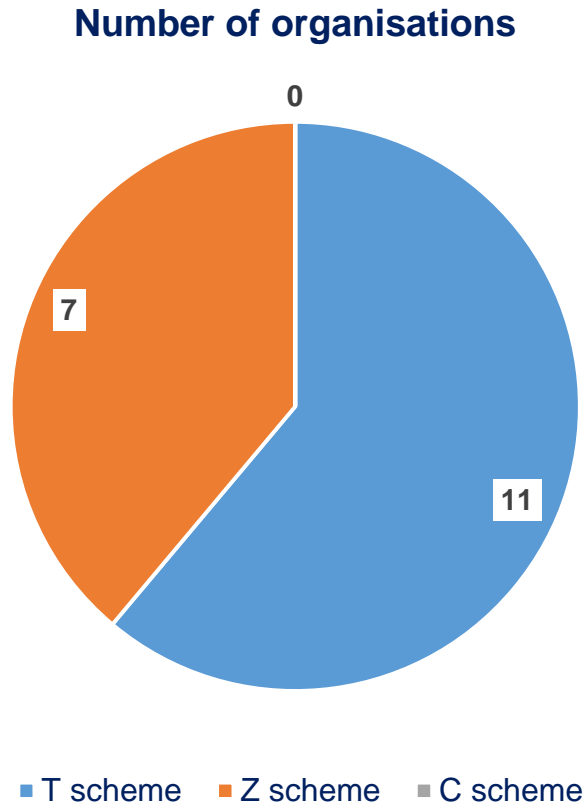


- Use of factors and coefficients from ICAR Guidelines
- Use of factors and coefficients from other countries
- Use our own factors and coefficients

- Most of MRO's use factors from Guidelines
- Difficulties to define own factors
- Require accumulated experience and knowledge



Which sampling schemes do you use for this method?

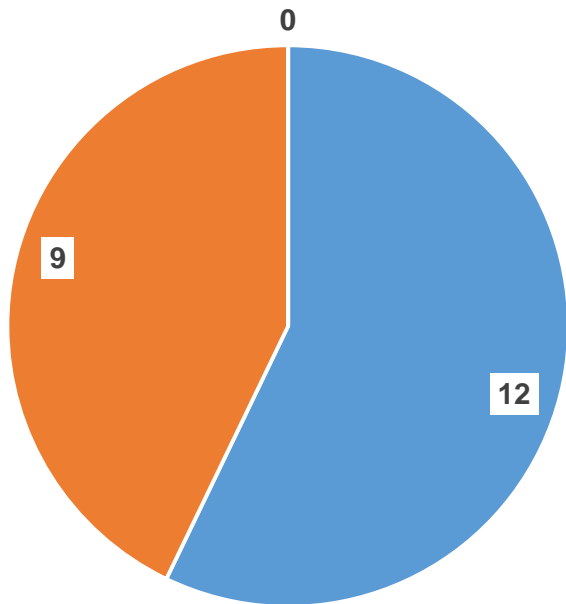


- Mostly use for T and Z schemes
- Some organisations propose both schemes
- Not use currently for C scheme



Which milking frequencies do you use this method for?

Number of organisations



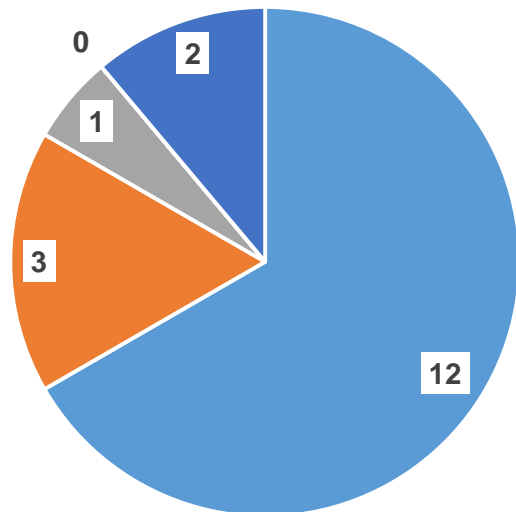
- 2x per day milking
- 3x per day milking
- 4 to 6 per day milking

- Use with 2x per day milking
- Also with 3x per day milking
- Not with 4 or 6 per day milking



How do you define milking times when using this method?

Number of organisations



- Milking start time on herd
- Middle milking time on herd
- Milking start time on group
- Middle milking time on group
- Milking start time individual

- Most common option is milking time on herd
- Mainly start time
- 2 organisations use individual start time
- No organisation combine different options



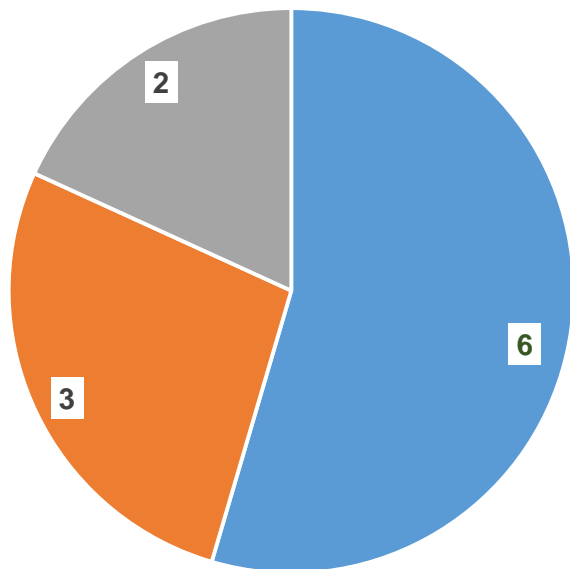
Other comments and experience regarding this method?

- *Saw teeth effect with short or long milking interval*
- *It works well as long as we get accurate times from dairy farm*
- *It works very well but problems with 3x milkings in am sample*
- *We have a lot of issues with calculation of fat (and SCC)*
- *In our experience, the comparison with delivered milk to dairy companies seems to be reasonably correct*
- *We have no performed any scientific study on this method*
- *We use this method for 3x milkings*
- *We don't think it works well in the case of big herds*



Do you use this method?

Number of organisations



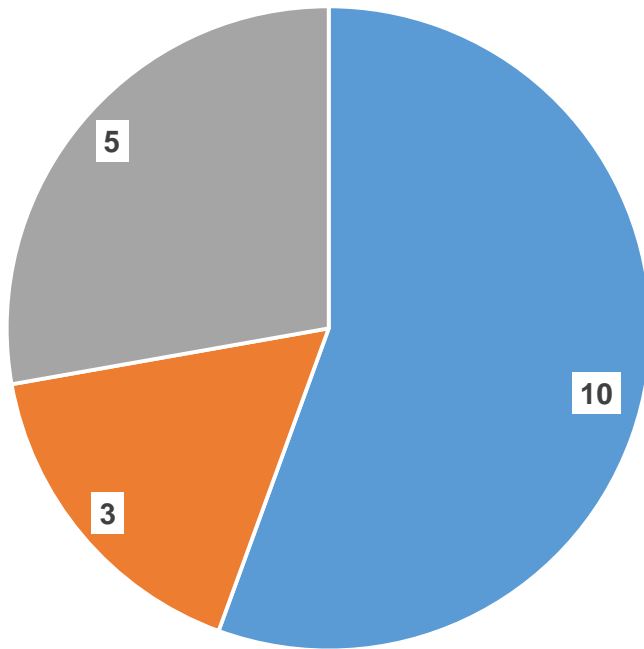
- Yes
- Yes, but we adapt some equations
- Yes, but we employ adaptations, parities...

- Used by 11 organisations
- 3 organisations adapting some equations
- 2 organisations making other adaptations



Which sampling schemes do you use for this method?

Number of organisations



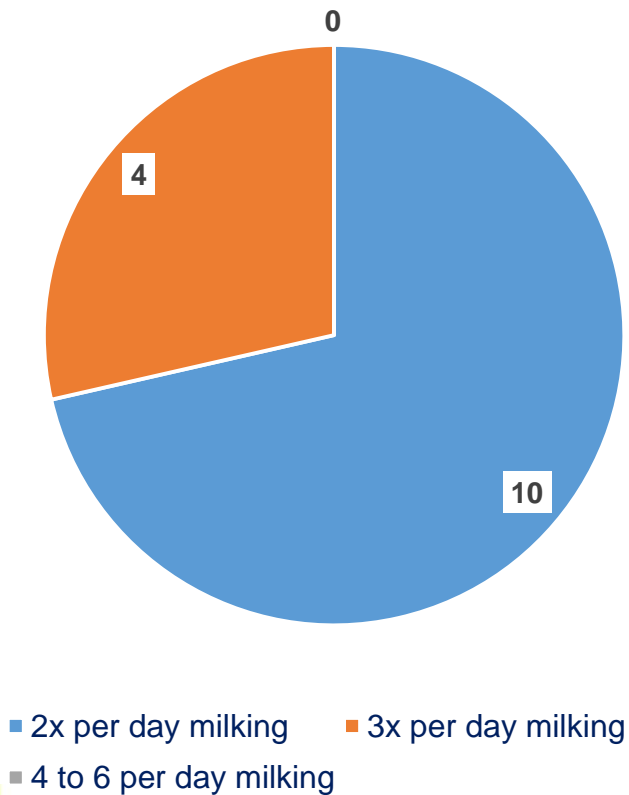
■ T scheme ■ Z scheme ■ C scheme

- Mainly use for T scheme
- 3 organisations use it for Z scheme
- 5 organisations for C scheme
- Some organisations use this method for both schemes



Which milking frequencies do you use for this method for?

Number of organisations

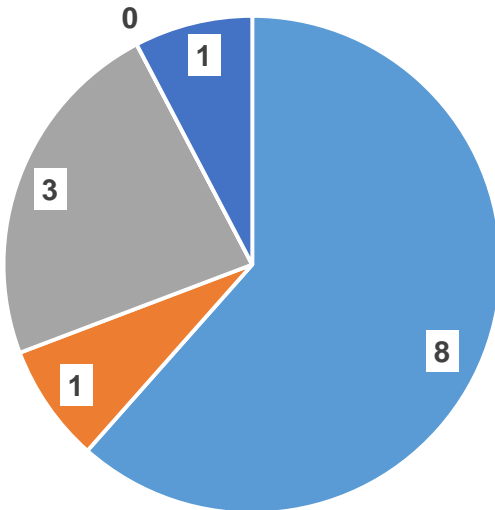


- Use mainly with 2x per day milking
- Also with 3x per day milking
- Not with 4 or 6 per day milking



How do you define milking times when using this method?

Number of organisations



- Milking start time on herd
- Middle milking time on herd
- Milking start time on group
- Middle milking time on group
- Milking start time individual

- Most common option is milking start time on herd
- 3 organisations use start time on group level
- 1 organisation use individual start time (most accurate approach but frequently unavailable)



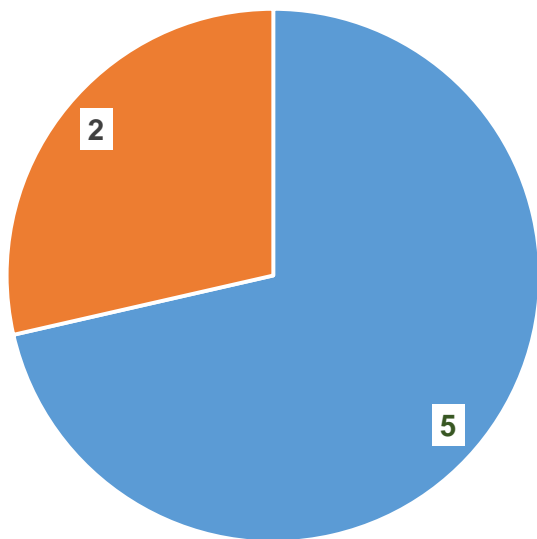
Other comments and experience regarding this method?

- *It can work well but milking start time is not recorded accurately*
- *In our model, we added another class of milking interval*
- *No problems with this method*
- *Very good results with this method*
- *Due to changes in milk yield and fat content over the last 15 years, a new model will be established in 2019*
- *The new version will be presented during Prague conference*
- *ICAR Guidelines will be updated one new coefficients presented*



Herds where regular milking intervals don't create 24-hour?

Number of organisations



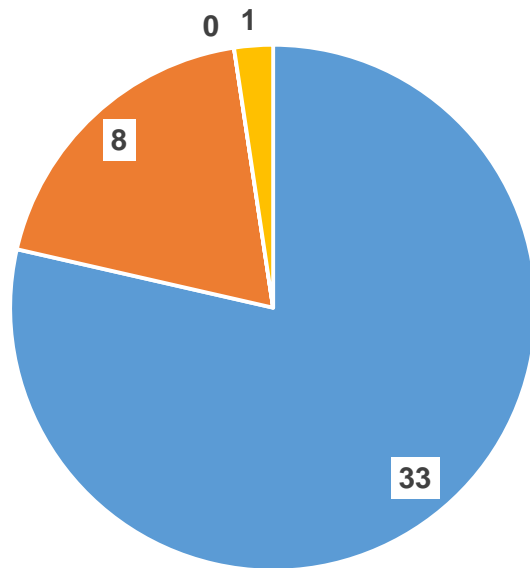
- Yes, less than 10% of herds
- Yes, more than 10% of herds

- 7 organisations specify that regular milking intervals don't create 24-hour
- It concerns more than 10% of herds for 2 organisations
- 5 organisations for less than 10% of herds



Do you use milk from more than one day when using EMM?

Number of organisations



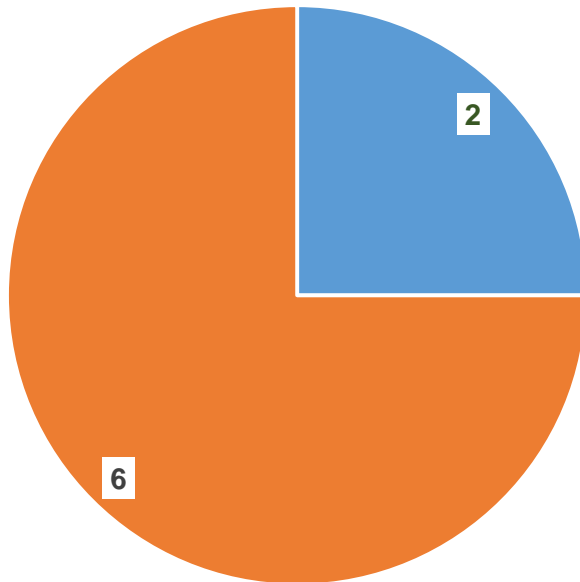
- One-day milking data
- Data from several days as ICAR
- Data from several days with adaptations
- 24-hour yields from days number differently

- Most organisations use data from one day
- 8 organisations in according with ICAR Guidelines
- When using multiple number of days the issue is animal identification



In measurement period, how do you treat the sampling date?

Number of organisations



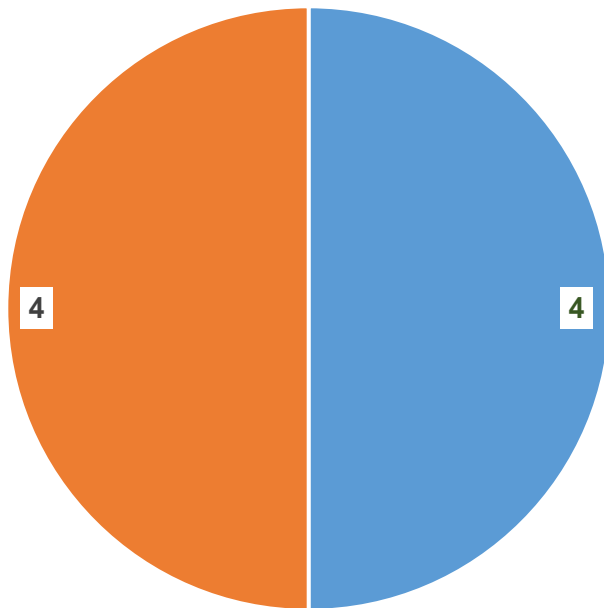
- The sampling date is excluded
- The sampling date is added

- Most common method is to add the sampling date
- Excluded the measurement is less common



How do you connect milk yields with milk analysis results?

Number of organisations



- Milk yield from a longer measurement period
- Milk yield on the sampling day only

- Half of the organisations uses connection between results of milk analysis and test-day
- The other half uses multiple number of days



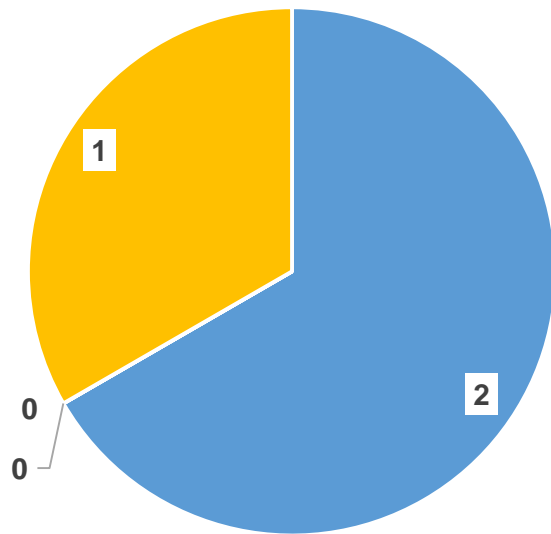
Other comments and experience regarding this method?

- *Milk yield is stable with an average of 7 days and samples corrected by intervals between milkings*
- *It would be necessary to improve this method in the future*
- *Overall this method is doing well*
- *It seems to be relevant for management purposes*
- *Very limited use only on test-day milk yields*



Do you use other methods not mentioned in the Guidelines?

Number of organisations



- Yes for sampling scheme T
- Yes for sampling scheme Z
- Yes for sampling scheme C
- Yes for other cases

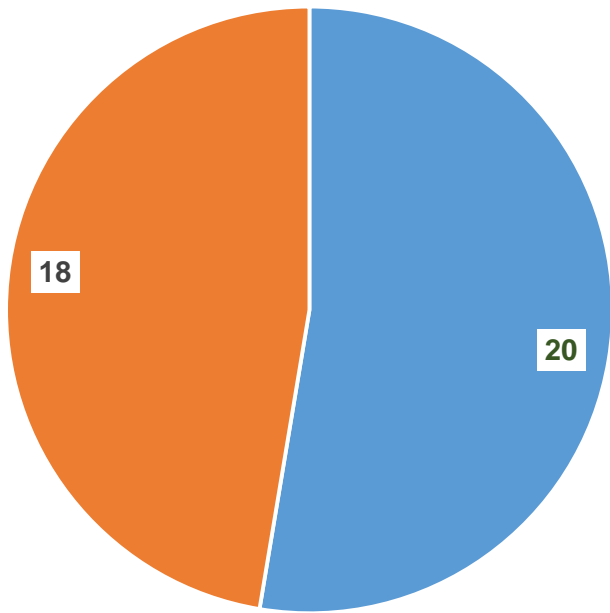
- There are 3 cases of classical milk recording methods not described in ICAR Guidelines
- 2 cases in T scheme
- 1 case for other cases
- These cases will be discussed, checked and analysed by DCMR WG

Estimating factors and coefficients



Do you estimate your own factors and coefficients?

Number of organisations



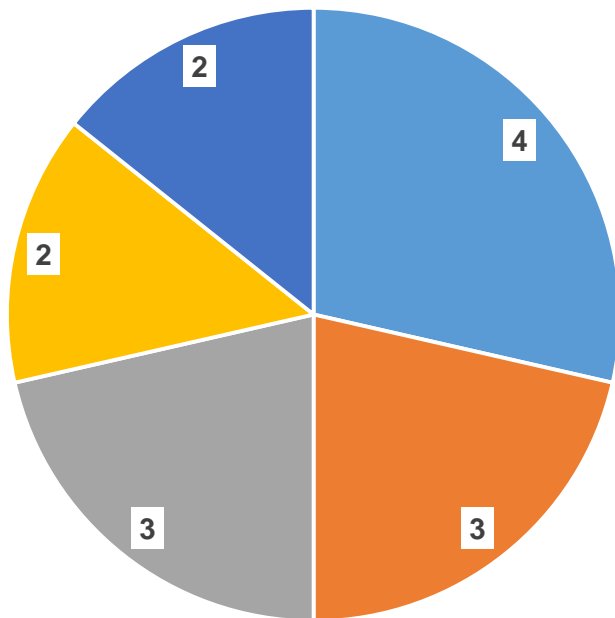
■ Yes ■ No

- Half organisations use their own factors and coefficients
- Poor data collection for coefficient estimation
- Most important problem is to find a very large reference data set
- Considerable variability among organisations which estimate factors, coefficients



How long does it take to calculate data for est./rec. coefficients?

Number of organisations



■ 2-5 years
■ Irregularly
■ Over 10 years

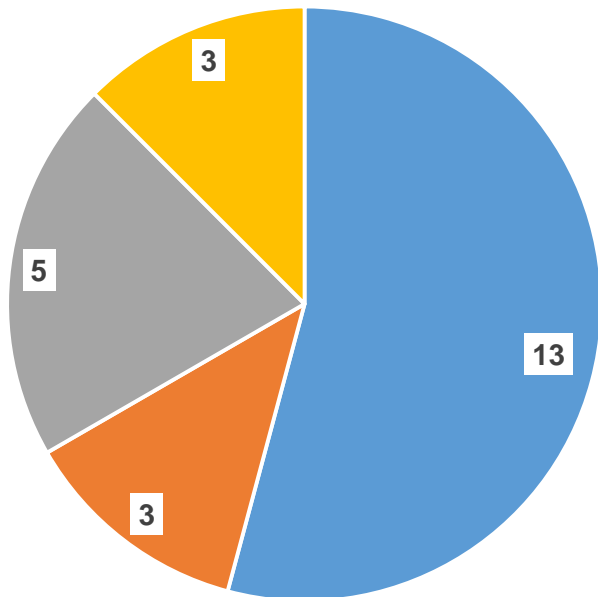
■ 5-10 years
■ Within 1 year

- The majority of answers shows that recalculations are performed in regular intervals
- Over 10 years for 2 organisations
- The DCMR WG will add recommendations to the new version of ICAR Guidelines on minimum and optimum number of herds, cows, milkings, lactations



How do you choose herds/cows for estimations/recalculations?

Number of organisations



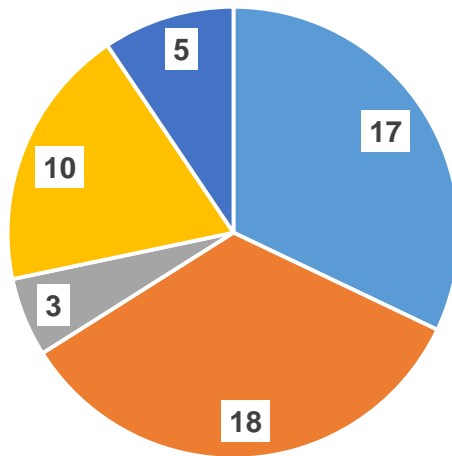
■ All data available
 ■ Randomly chosen
■ We set our own criteria
 ■ Statistical analysis

- The majority of organisations uses all data available
- For one organisation, herd sampling covers all national territory
- For another organisation, the coefficients are calculated randomly for half the population and validated against the other half



Which data are excluded?

Number of organisations



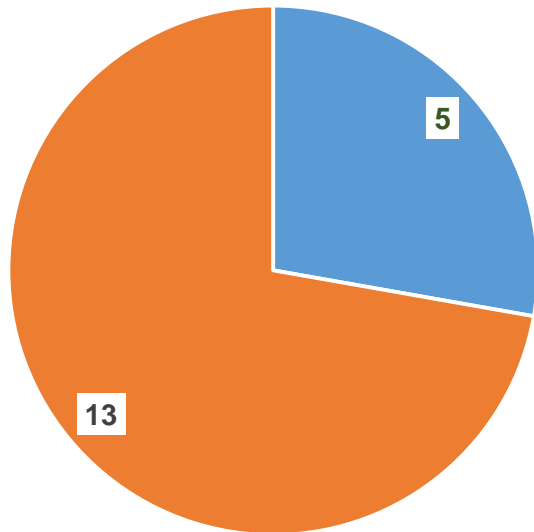
- Duplicate records
- Records with missing information
- Intervals between milkings
- Differences in milk yield between milkings
- Lactation stage

- Most of organisations exclude records with missing information, duplicate records, large differences in milk yield
- Several organisations use criteria: interval between milkings (greater than 16 hours,...), lactation stage (greater than 360 days,...), number of lactations (greater than 9,...)



Are there any differences between breeds?

Number of organisations



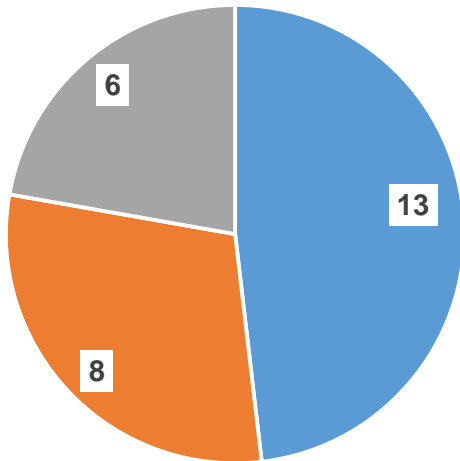
- Yes, different factors are used for different breeds
- No

- The majority of answers specified no differences between breeds
- Reference data for breeds with small number of animals are unavailable



How do you evaluate results and which indicators do you use?

Number of organisations



- Correlation between esti./pred. and actual/true daily yields
- Comparison of mean, standard deviation
- Systematic bias, SD of differences and accuracy (R2)

- The majority of answers indicates a preference for correlation, mean, bias,...
- Some organisations combine indicators from more groups
- Recommendations will be added to the new version of ICAR Guidelines

Conclusion



- *This survey obtained a very good score with 52 answers*
- *A trend towards simplifying milk recording process and reducing the number of samples is evident*
- *3 organisations use methods not contained in ICAR Guidelines*
- *The general trend is to calculate own factors*
- *Coefficients and factors are regularly checked*
- *Organisations use relevant statistical indicators*

➔ There is a lot of material to improve ICAR Guidelines and to propose new recommendations on 24-hour



Thank you for your attention

