

a b e t t e r u n d e r s t a n d i n g

Automatic Milking

International Symposium Lelystad, The Netherlands March, 24 – 26, 2004



Programme



ANIMAL SCIENCES GROUP
WAGENINGEN **UR**

International Symposium on Automatic Milking

For a better understanding

Dear colleagues,

On behalf of the Animal Sciences Group of Wageningen UR and the Project Management Committee of the EU-granted project "Implications of the introduction of automatic milking on dairy farms" we welcome you to our International Symposium on **Automatic Milking**. We were very pleased by the more than 120 abstracts we received in response to our call for papers and by the 300 participants that already had registered by the end of January.

Many of you may cherish the memory of our previous symposium on Robotic Milking in August 2000. Then, we added the optimistic subtitle "the future is here" since the state of technology allowed a commercial introduction of automatic milking systems, and about 500 farms worldwide already milked by robot.

However, together we were very much aware that this future was still paved with uncertainties about the comparative economic advantages of automated milking in terms of investment and labour requirement, about maintaining milk quality and conformity with milk hygiene regulations, about implications for animal health, animal welfare and farm management in general, and about reaction of society to a robotic approach of the dairy cow.

From December 2000 on, these issues have been addressed in a EU-granted project in which research institutes and manufacturers of automatic milking systems from Sweden, Denmark, Germany, Belgium, United Kingdom and The Netherlands joined their expertise. In this project, but also in other studies performed all over the world, much scientific knowledge has been generated which may take away, at least part of, our uncertainties about benefits, consequences and side conditions of automatic milking.

Meanwhile empirical knowledge has both led to a continuous improvement of automatic milking devices and to a more system conform herd manage-

ment. Hence, in a short period of time automatic milking has become a realistic alternative for milking in the “traditional” milking parlour, particularly in Sweden, Denmark and The Netherlands. Moreover, interest in other European countries, but also in Canada, USA, Japan, Australia and New Zealand, is increasing and the number of farms with automatic milking system(s) adds up to around 2200 worldwide.

Now, in the final days of the EU-project, we organised the present symposium to merge the results from this project with knowledge from other studies and with field experiences **for a better understanding** of automatic milking. An understanding that will contribute to an application of automated milking without undesirable side effects.

During the symposium 12 invited presentations, 36 submitted presentations and more than 80 poster presentations originating from 16 countries will be given in 4 plenary, 8 parallel and 2 poster sessions. The presented papers and poster abstracts are combined in the proceedings.

The authors and the members of the scientific committee have done a great job in preparing and selecting the contributions, which is gratefully acknowledged. So is the financial support by our sponsors.

We hope that all participants gather new insights and make new friends!

*The Organising Committee,
Dr. Albert Meijering, chairman*

Organising Institute

Animal Sciences Group:

knowledge of today, solutions for tomorrow



Solid knowledge. Animals play a significant role in our society. Apart from being a source of food, they are also indispensable for welfare, health, recreation, education and nature conservation. Solid scientific and practically minded knowledge is necessary to optimally address the variety of functions of animals in our society.

Sustainable methods. The Animal Sciences Group of Wageningen University & Research Centre offers research, education and expertise on livestock, fish and companion animals. Our work is concerned with sustainable methods for food production, sound ecological management of landscape, nature and sea and the social functions that animals fulfil.

Innovative insights. Our in-depth scientific and application-oriented approach to problems puts us in good stead to work alongside our clients towards innovative insights and products, to bolster the industry as well as to benefit the public domain and society as a whole. Besides the Dutch government, in particular the Ministry of Agriculture, Nature and Food Quality, our clients include international and regional governments. Farmers and fishers, commodity boards and globally operating companies from the agro food complex and the life science and pharmaceutical industries all use knowledge that we develop working together with them.

International leading. Excellent scientists, innovative education and state-of-the-art and effective fundamental and applied research enable us to command a leading role in the international arena. With a workforce of 1100 and the potential to carry out high quality technological research in our well-equipped facilities, we develop the knowledge of today for the solutions of tomorrow.

Worldwide projects. We contribute to agricultural development projects worldwide, especially in Eastern Europe, Asia and Africa. These often entail supplying technical and economic expertise for agricultural or rural development projects, such as setting up and supervising model farms and building up good knowledge transfer to local livestock farmers. We also supply expertise for setting up and supervising applied research and strengthening the links between research, extension and practice.

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Symposium programme

Wednesday, March 24

15.00 – 17.00	Press Conference	<i>Parketzaal</i>
17.00 – 21.00	Registration	
19.00 – 21.00	Welcome reception hosted by Ch. Leeuwe , Mayor of Lelystad	<i>Atrium</i>

Thursday, March 25

8.00 – 9.00	Registration	
8.30 – 8.40	Welcome address, Ruud Huirne , General Director of the Animal Sciences Group, Wageningen UR	<i>Theater</i>
8.40 – 9.10	Position paper: Automatic Milking, state of the art in Europe and North America, Kees de Koning (NL) and Jack Rodenburg (CA)	
9.10 – 10.40	Plenary session 1	
10.40 – 11.00	Coffee break	<i>Atrium and Koepelterrass</i>
	Theater	Blauwe zaal
11.00 – 12.15	Parallel session 1.1. Socio-economic aspects	Parallel session 1.2. Farm and system hygiene
12.15 – 13.30	Lunch and posters	<i>Atrium/Balcony</i>
13.30 – 15.00	Plenary session 2	<i>Theater</i>
15.00 – 15.15	Tea break	<i>Atrium and Koepelterrass</i>
	Blauwe Zaal	Theater
15.15 – 17.15	Parallel session 2.1. Animal health	Parallel session 2.2. Abnormal milk
17.15	Adjourn	
20.00 – 22.30	Dinner Key note address: Milk in the news, Ulrike Maris and Keith Roe (BE)	<i>Atrium</i>

Friday, March 26		
8.30 – 9.30	Plenary session 3	<i>Theater</i>
9.30 – 9.45	Coffee break	<i>Atrium and Koepelterras</i>
	Blauwe Zaal	Theater
9.45 – 11.30	Parallel session 3.1. Grazing	Parallel session 3.2. Milk quality
11.30 – 12.30	Posters and lunch	<i>Balcony/Atrium</i>
13.30 – 14.30	Plenary session 4	<i>Theater</i>
14.30 – 14.45	Tea break	<i>Atrium and Koepelterras</i>
	Blauwe Zaal	Theater
14.45 – 16.45	Parallel session 4.1. Welfare	Parallel session 4.2. Farm and herd management
16.45 – 17.00	Closing address, Albert Meijering , Chairman of the Organising Committee	<i>Theater</i>
17.00	Adjourn	

Plenary sessions (Theater)

Plenary session 1

Chair: Albert Meijering (NL)

E. Mathijs, (BE) Socio-economic aspects of automatic milking

K. Knappstein, N. Roth, B. Slaghuis, R. Ferwerda-Van Zonneveld, H.-G. Walte and J. Reichmuth (DE) Farm hygiene and teat cleaning requirements in automatic milking

E. Schuiling (NL) The cleaning of automatic milking systems

Plenary session 2

Chair: Kees de Koning (NL)

J.E. Hillerton, J. Dearing, J. Dale, J.J. Poelarends, F. Neijenhuis, O. C. Sampimon, J.D.H.M. Miltenburg and C. Fossing (UK) Impact of automatic milking on animal health

M. D. Rasmussen (DK) Detection and separation of abnormal milk in automatic milking systems

K. Knappstein, G. Suhren and H.-G. Walte (DE) Impact of automatic milking on excretion of antibiotic residues

Plenary session 3

Chair: Henk Hogeveen (NL)

E. Spörndly, C. Krohn, H.J. van Dooren and H. Wiktorsson (SE) Automatic milking and grazing

K. de Koning, B. Slaghuis and Y. van der Vorst (NL) Milk quality on farms with an automatic milking system

Plenary session 4

Chair: Henk Hogeveen (NL)

H. Wiktorsson and J. Tind Sørensen (SE)

Implications of automatic milking on animal welfare

W. Ouweltjes and K. de Koning (NL)

Demands and opportunities for operational management support

Parallel sessions

Parallel session 1.1.

Theater

Socio-economic aspects

Chair: Erik Mathijs (BE)

Wauters, E. and E. Mathijs (BE)

The economic implications of automatic milking: a simulation analysis for Belgium, Denmark, Germany and The Netherlands

Hogeveen, H., K. Heemskerk and E. Mathijs (NL)

Motivations of Dutch farmers to invest in an automatic milking system or a conventional milking parlour

Wade, K.M., M.A.P.M. van Asseldonk, P.B.M. Berentsen, W.

Ouweltjes and H. Hogeveen (NL)

Economic efficiency of automatic milking systems with specific emphasis on increases in milk production

Discussion

Posters:

- 54 **Hatakeyama, N. (JP)** Evaluation of the AM-system adopting and using farmers - A case study of Japanese dairy farms –
- 77 **Jensen T.C. (DK)** Expectations of automatic milking and the realized socio-economic effects
- 98 **Bos, K. (NL)** Energy consumption on farms with an AM-system

Parallel session 1.2.*Blauwe Zaal***Farm and system hygiene**

Chair: Karin Knappstein (DE)

Benfalk, C. and M. Gustafsson (SE) Investigation of different cleaning frequencies in Automatic Milking Systems

Bruckmaier, R.M. and H.H.D. Meyer (DE) Induction of milk ejection during teat cleaning in robotic milking systems

Ordolff, D.W. (DE) Evaluating cleanliness of udders with an image processing system

Discussion

Posters:

- 19 **Tangorra F.M., V. Bronzo, A. Casula, M. Cattaneo, C. Martinazzi, P. Moroni, M. Zaninelli and A.G. Cavalchini (IT)**
Assessment of teats cleaning system efficiency of a milking robot
- 79 **Melin, M., H. Wiktorsson and A. Christiansson (SE)**
Teat cleaning efficiency before milking in DeLaval VMS™ versus conventional manual cleaning
- 84 **Gustafsson, M. and C. Benfalk (SE)** Different locations of instant cooling in the automatic milking system and the effect on milk quality
- 102 **Slaghuis, B.A., R.T. Ferwerda-Van Zonneveld and A. Mooiweer (NL)** Cleaning effects of teat cleaning in robotic milking systems by use of poppy seed as tracer
- 109 **Slaghuis, B.A., R.T. Ferwerda-Van Zonneveld, M.C. te Giffel and G. Ellen (NL)** Cobalt as a tracer for estimation of residues in milk after application of automatic teat cleaning systems

Parallel session 2.1.*Blauwe Zaal***Animal health**

Chair: Eric Hillerton (UK)

Dearing, J., J.E. Hillerton, J.J. Poelarends, F. Neijenhuis, O.C. Sampimon and C. Fossing (UK) Effects of automatic milking on body condition score and fertility of dairy cattle

Vosika, B., D. Lexer, Ch. Stanek, J. Troxler and S. Waiblinger (AT) The influence of an automatic milking system on claw health and lameness of dairy cows

Neijenhuis, F., K. Bos, O.C. Sampimon, J.J. Poelarends, J.E. Hillerton, C. Fossing and J. Dearing (NL) Changes in teat condition in Dutch herds converting from conventional to automated milking

Poelarends, J.J., O.C. Sampimon, F. Neijenhuis, J.D.H.M. Miltenburg, J.E. Hillerton, J. dearing and C. Fossing (NL) Cow factors related to the increase of somatic cell count after introduction of automatic milking

Zecconi A., R. Piccinini, G. Casirani, E. Binda and L. Migliorati (IT) Introduction of AMS in Italian dairy herds. Effects on teat tissues, intramammary infection risk, and spread of contagious pathogens

Discussion

Posters:

- 9 **Tančin V., A.H. Ipema, D. Peškovičová, P.H. Hogewerf, Š. Mihina, J. Mačuhová (SK)** Quarter milk flow patterns in dairy cows: factors involved and repeatability
- 15 **Rasmussen, M. D. , L. Foldager, and T. C. Hemling (DK)** Impact of teat dip composition on teat condition and udder health
- 24 **Wenzel, C. and A. Nitzschke (DE)** Study on the incidence of ketosis in dairy cows in an automatic milking system versus a conventional milking system
- 31 **Persson Waller K, T. Westermark, T. Ekman and K. Svennersten-Sjaunja (SE)** Milk leakage in automatic and conventional milking systems

- 41 **Skjøth, F., M.D. Rasmussen, L.A.H. Nielsen and K. Krogh (DK)**
Animal health of herds converting to automatic milking system
- 51 **Grove, S., T. W. Bennedsgaard, M. D. Rasmussen and C. Enevoldsen (DK)** A study of the effect of lameness on voluntary milking frequency of dairy cows milked automatically
- 52 **Bennedsgaard, T.W., M. D. Rasmussen and M. Bjerring (DK)**
Blind quarters in automatic milking systems – causes and consequences
- 66 **Hamann, J., H. Halm and R. Redetzky (DE)** Influence of an automatic milking system (VMS[®]) on milk secretory activity of healthy and diseased udder quarter
- 81 **Dearing, J. and J. E. Hillerton (UK)** Changes in cow locomotion in UK herds converting from conventional to automated milking
- 87 **Klaas, I. C., M. Bjerring and C. Enevoldsen (DK)** Risk factors for teat end callosity in dairy farms operating with automatic milking systems (AMS)
- 105 **Migliorati, L., F. Calza, G. Pirlo, G. Casirani and A. Zeconi (IT)**
Introduction of AMS in Italian herds: udder symmetry, teat thickness and health in an automatic milking system
- 106 **Neijenhuis, F., J.E. Hillerton, K. Bos, O. Sampimon, J. Poelarends, C. Fossing, and J. Dearing (NL)** Effects of milking interval on teat condition and milking performance with whole-udder take off

Parallel session 2.2.*Theater***Abnormal milk**

Chair: Morten Dam Rasmussen (DK)

Hamann, J. and H. Halm (DE) Influence of varying milking intervals on milk composition - a physiological approach on secretion of "normal milk"**Wiedemann, M. and G. Wendl (DE)** The use of spectral photometry for detection of mastitis milk**Whyte, D.S., R.G. Orchard, P.S. Cross, T. Frietsch, R.W. Claycomb and G.A. Mein (NZ)** An on-line somatic cell count sensor**Benedsgaard, T.W., S. Elvstrøm and M.D. Rasmussen (DK)**

Selection of cows for treatment of udder infections in AMS herds

Pietersma, D. and H. Hogeveen (CA) Cost of discarding milk with automatic separation of abnormal milk

Discussion

Posters:

- 13 **Maassen-Francke, B., M. Wiethoff, O. Suhr, C. Clemens and A. Knoll (DE)** A method to detect flakes and clots in milk in automatic milking systems
- 14 **Tsenkova, R., H. Morita, H. Shinzawa and J. E. Hillerton (JP)** Detection of abnormal udder tissue and milk by near infra-red spectroscopy (cow side)
- 28 **Whyte, D.S., R.G. Orchard, P. Cross, A. Wilson, R.W. Claycomb and G.A. Mein (NZ)** Seeing red: automated detection of blood in milk
- 29 **Mein, G.A., R.A. Sherlock and R.W. Claycomb (NZ)** Making sense of in-line sensing for milk conductivity
- 35 **Barth, K. (DE)** Detection of tissue damages caused by milking machines using conductivity measurement
- 43 **Norberg, E. and I. R. Korsgaard (DK)** Electrical conductivity of milk as an indicator trait for mastitis

- 58 **Binda, E., G. Casirani, R. Piccinini and A. Zecconi (IT)**
Introduction of AMS in Italian dairy herds. The detection of clinical and subclinical mastitis by AMS systems
- 72 **Hovinen, M., A-M. Aisla, P. Anttila and S. Pyörälä (FI)**
Detection of mastitis and poor milk quality in automatic milking
- 73 **Pongrácz, L. and E. Báder (HU)** The change of milk quality during lactations
- 121 **Ramírez-García, S., V. Favry, K. Lau, G. McMahon and D. Diamond (IE)** Impedance based sensor for mastitis detection in milk
- 122 **Larsen, L.B., M.D. Rasmussen, M. Bjerring and J.H. Nielsen (DK)** Proteolysis of milk protein from uninfected glands and glands infected with *Streptococcus uberis*
- 123 **Larsen, L.B., M.D. Rasmussen, M. Bjerring and J.H. Nielsen (DK)** Composition of milk clots



Parallel session 3.1.*Blauwe Zaal***Grazing**

Chair: Christian Krohn (DK)

Van Dooren, H.J.C., M.E. Haarman, J.H.M. Metz, L.F.M. Heutinck (NL) How pasturing influences the use of AMS – A survey among 15 dairy farms in The Netherlands

Munksgaard, L. and M. Søndergaard (DK) Two case studies on farms combining automatic milking with grazing - timebudgets, synchronisation of behaviour and visits to the robot

Van Dooren, H.J.C., L.F.M. Heutinck, G. Biewenga and J.L. Zonderland (NL) The influence of three grazing systems on AMS performance

Woolford, M.W., R.W. Claycomb, J. Jago, K. Davis, I. Ohnstad, R. Wieliczko, P.J.A. Copeland and K. Bright (NZ) Automatic dairy farming in New Zealand using extensive grazing systems

Greenall, R., M. Warren and E. Warren (AU) Integrating Automatic Milking Installations (AMIs) into grazing systems - Lessons from Australia

Discussion

Posters:

- 8 **Krohn, C.C. (DK)** Seven case studies about automatic milking and grazing in private herds
- 55 **Woolford, M.W., R. W. Claycomb, J. Jago, K. Davis, I. Ohnstad, R. Wieliczko, P.J.A. Copeman and K. Bright (NZ)** Automatic dairy farming in New Zealand using extensive grazing systems
- 94 **Wredle, E., L. Munksgaard and E. Spörndly (SE)** An individual cow-calling system to motivate cows to return from the pasture to the milking unit
- 110 **Van Dooren, H.J.C., L.F.M. Heutinck and G. Biewenga (NL)** Combining automatic milking and grazing. Practice in The Netherlands

Parallel session 3.2.*Theater***Milk quality**

Chair: Kees de Koning (NL)

Slaghuis, B.A., K. Bos, O. de Jong, A.J. Tudos, M.C. te Giffel and K. de Koning (NL) Robotic milking and free fatty acids

Wiking, L., L. Björck and J.H. Nielsen (DK) Impact of size distribution of milk fat globules on milk quality affected by pumping

Hamann, J. (DE) Pattern of somatic cell count in milk under automatic milking conditions (VMS) and interactions with milk constituents

Berglund, I., G. Pettersson, K. Östensson and K. Svennersten-Sjaunja (SE) Quarter milking – a possibility for detection of milk quarters with elevated SCC

Pirlo G., G. Bertoni and R. Giangiacomo (IT) Introduction of AMS in Italian dairy herds. Effects on cow performances and milk quality in a herd of the Grana Padano area

Discussion

Posters:

- 17 **Borsboom, P.C.F. and J. Dommerholt (NL)** Towards specification in-line monitoring primary milk production
- 25 **McKinzie, M., I. Laquiere, T. C. Hemling, and S. DeVliegher (US)** Milk iodine residues: AMS versus conventional
- 62 **Hamann, J., F. Reinecke, H. Stahlhut-Klipp and Th. Grabowski (DE)** Effects of an automatic milking system (VMS[®]) on free fatty acids (FFA) in different milk fractions
- 68 **Degano, L., G. Contarini, O. Formichi, D. Ravera and R. Giangiacomo (IT)** Introduction of AMS in Italian dairy herds. A new system for the evaluation of milk fat globule size as affected by automatic Milking
- 69 **Giangiacomo, R., T.M.P. Cattaneo, G. Contarini, F. Abeni and G. Colzani (IT)** Introduction of AMS in Italian dairy herds. Long ripened cheese production from robotic milking

- 96 **Abeni, F., L. Degano and F. Calza (IT)** Introduction of AMS in Italian dairy herds. Preliminary observations on milk fat parameters for long ripening cheese production with primiparous dairy cows
- 115 **Helgren, J.M. and D.J. Reinemann (US)** Survey of milk quality on United States dairy farms utilizing Automatic Milking Systems
- 118 **Ekman, T., C. Hallén Sandgren, M. Gyllensvärd, I. Andersson and B. Everitt (SE)** Milking with robots: the Swedish experience



Parallel session 4.1.*Blauwe Zaal***Welfare**

Chair: Hans Wiktorsson (SE)

Hindhede, J., T. Rousing, I.C. Klaas and J.T. Sørensen (DK)

A welfare assessment report as a decision support tool in an AMS herd: Practical experiences

Rousing, T., J. Hindhede, I. Klaas, M. Bonde and J.T. Sørensen (DK)

Assessment of animal welfare in an AMS herd: Expert evaluation of a decision support system

Neuffer, I., R. Hauser, L. Gygax, C. Kaufmann and B. Wechsler

(CH) Assessment of welfare of dairy cows milked in different automatic milking systems

Lexer, D., K. Hagen, R. Palme, J. Troxler and S. Waiblinger (AT)

Relationships between time budgets, cortisol metabolite concentrations and dominance values of cows milked in a robotic system and a herringbone parlour

Heutinck, L.F.M., H.J.C. van Dooren and G. Biewenga (NL)

Automatic milking and grazing in dairy cattle: effects on behaviour

Discussion

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- 38 **Persson Waller K. and J.Olofsson (SE)** Measuring welfare in dairy cows – health aspects
- 50 **Hagen, K., D. Lexer, R. Palme, J. Troxler and S. Waiblinger (AT)** Indicators of stress in Simmental and Brown Swiss cows during milking in a robotic system compared to a herringbone parlour
- 60 **Klaas, I. C, C. Fossing, M.K. Bonde and J. Hindhede (DK)** Clinical examinations in welfare assessment in herds operating with an automatic milking system (AMS)
- 85 **Olofsson, J. and K. Svennersten-Sjaunja (SE)** Improved animal welfare in AMS?

- 86 **Olofsson, J. (SE)** Measuring welfare in dairy cows – behavioural aspects
- 91 **Speroni, M., S. Lolli and G. Pirlo (IT)** Introduction of AMS in Italian herds: effects on animal behaviour
- 95 **Ipema, A.H., L. de Haan, J. Hemming and W.G.P. Schouten (NL)** Image analysis for monitoring unrest or discomfort of cows during milking
- 97 **Abeni F., L. Calamari, M. Speroni and G. Bertoni (IT)** Introduction of AMS in Italian dairy herds. Welfare assessment based on metabolic and endocrine responses in primiparous dairy cows
- 112 **Hermans, G.G.N., M. Melin, G. Pettersson and H. Wiktorsson (SE)** Behavior of high- and low-ranked dairy cows after redirection in selection gates in an automatic milking system
- 113 **Haverkamp, D.J., G. Pettersson and H. Wiktorsson (SE)** Effects on feed intake, milking frequency and milk yield of dairy cows of semi-forced or free cow traffic in AMS



Parallel session 4.2.*Theater***Farm and herd management**

Chair: André van der Kamp (NL)

Melin, M. and H. Wiktorsson (SE) Integration of cow activity in individual management systems; Analysis of individual feeding patterns in Automatic Milking Systems

Ipema, A.H. and P.H. Hogewerf (NL) Effects of milking machine parameters on the mean milk flow rate in a robotic milking system

Kristensen, T. and E. Noe (DK) Considerations at establishment of automatic milking systems in existing herd facilities

Ayadi, M., I. Llach, G. Caja, I. Bustos, A. Bach and X. Carré (ES) Udder cistern evaluation to help the decision making process of assigning the appropriate milking frequency in automatically milked cows

Petterson, G. and H. Wiktorsson (SE) Illumination or guiding light during night hours in the resting area of AM-barns

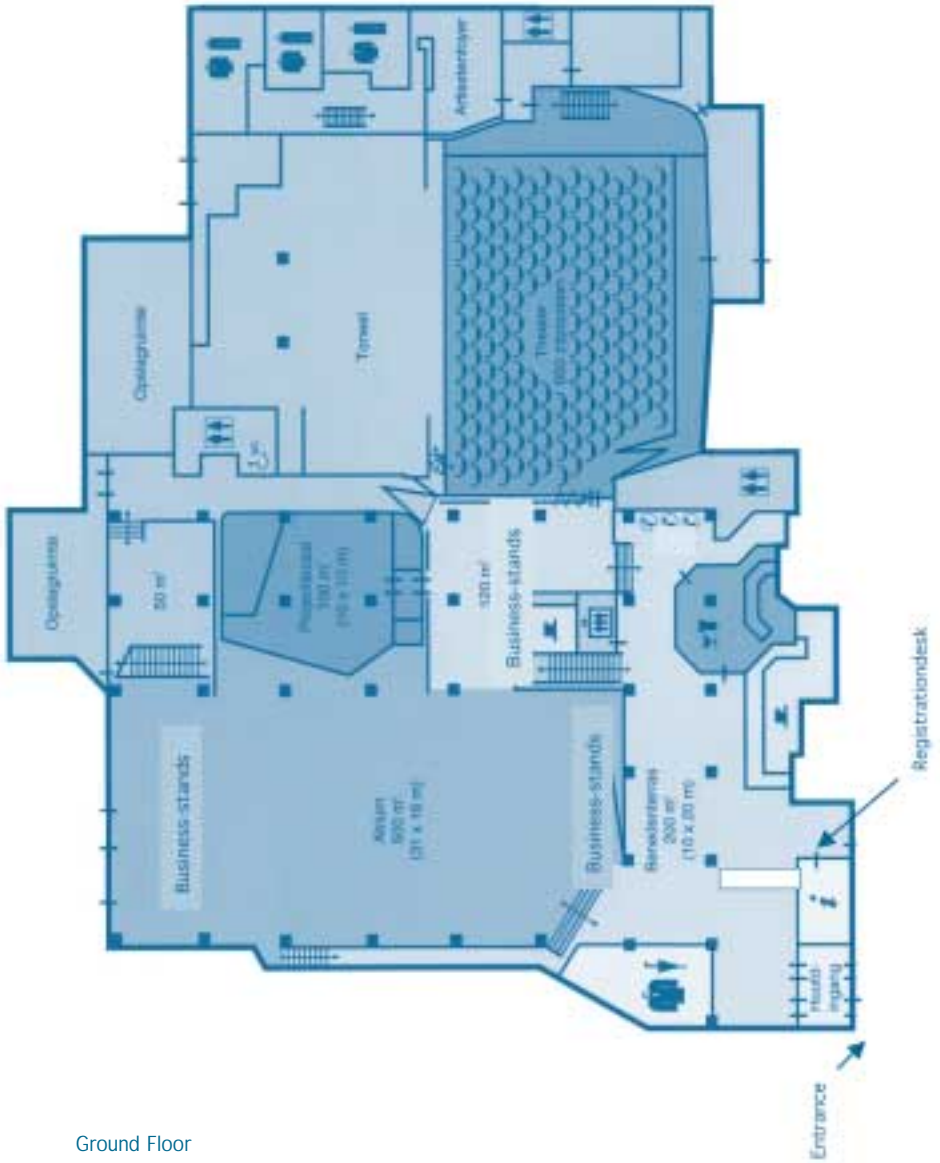
Discussion

Posters:

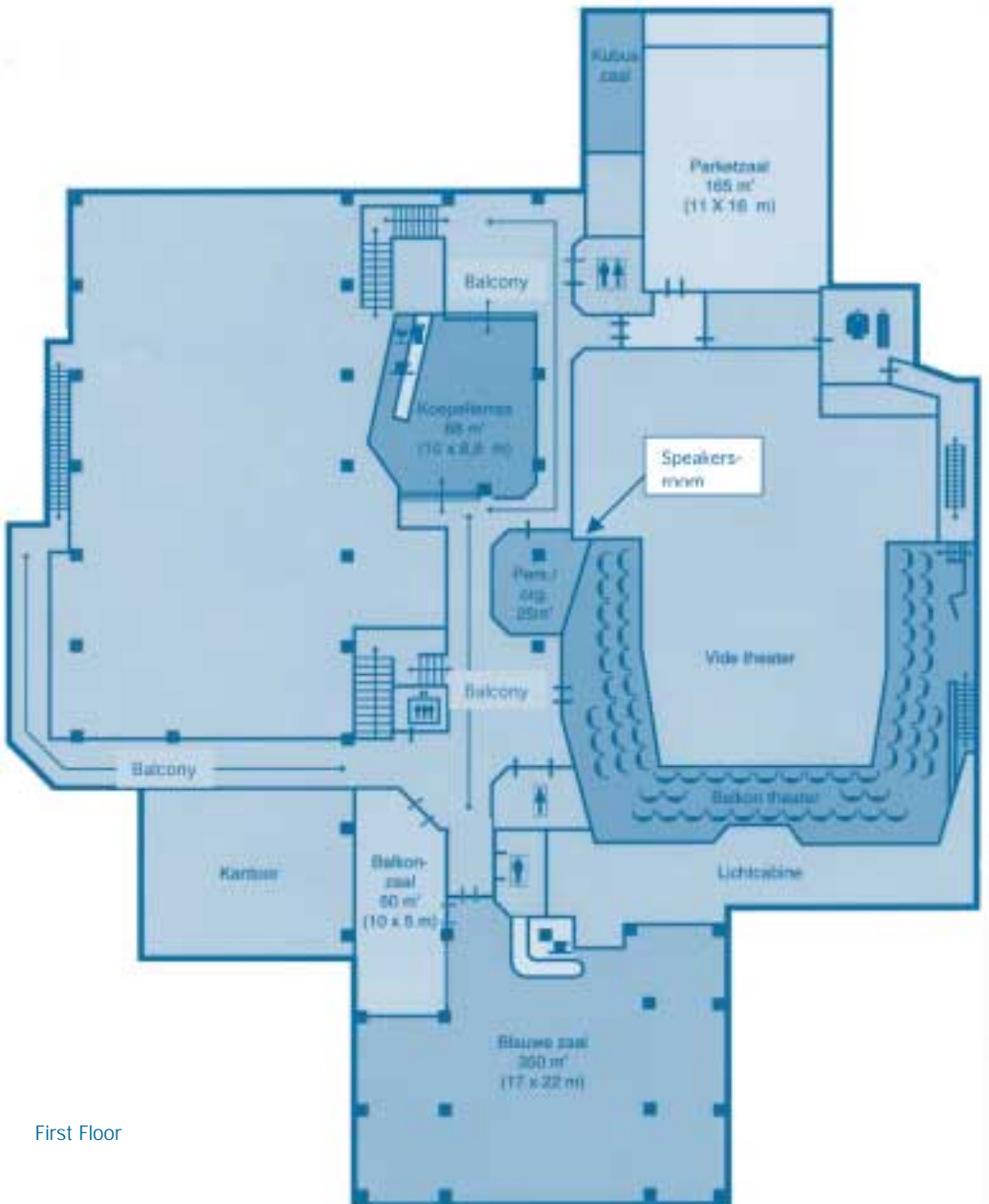
- 1 **Harms, J. and G. Wendl (DE)** Influence of cow traffic on milking and animal behaviour in a robotic milking system
- 2 **Shoshani, E. and E. Ezra (IL)** The effect of housing on implementation of automatic milking in Israel
- 4 **Moriz, C. (CH)** Automatic Milking Systems – System performance and working time
- 5 **Artmann, R. (DE)** System capacity of single box AMS and effect on the milk performance
- 10 **Bach, A., I. Busto, and X. Carre (ES)** Udder stimulation without milking decreases milk production at the following milking but has no further consequences on milk production
- 11 **Bach, A., I. Busto, and X. Carre (ES)** The impact of milking interval regularity on milk production

- 12 **Halachmi, I. (IL)** Managing an automatic milking farm; minimizing the amount of concentrates in the robot
- 18 **Bjerring, M., T. Lind, F. Skjøth, and M.D. Rasmussen (DK)** Transfer of data from management systems to central databases
- 22 **Klop, A. and K. Bos (NL)** The effects of diet composition and feeding system on cow activity and voluntary milking in an AMS
- 26 **Morita, S., A. Kageyama, A. Murakami, H. Kawakami, M. Komiya and S. Hoshiba (JP)** Eating and resting behavior of cows in bedded pack type loose housing with an automatic milking system
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- 32 **Tokida, M., S. Morita, M. Komiya and T. Kida (JP)** A study of practical use of automatic milking system in Japan
- 37 **Luther, H., E. Stamer, W. Junge and E. Kalm (DE)** Analysis of teat cup attachment under practical conditions
- 42 **Rodenburg, J., E. Focker, and K. Hand (CA)** Effect of the composition of concentrate fed in the milking box, on milking frequency and voluntary attendance in automatic milking systems
- 48 **Komiya, M., S. Morita, K. Kawakami and M. Yokoyama (JP)** Optimization of feed intake in automatic milking system
- 64 **Hamann, J., H. Halm, R. Redetzky and N.Th. Grabowski (DE)** Influence of incomplete milkings on milk yield under automatic milking conditions (VMS®)
- 67 **Llach, I., A. Bosch, M. Ayadi, G. Caja, M. Xifra and X. Carré (ES)** Effects of milking frequency and lactation stage on milk yield and milk composition of test day records in robotic milking
- 74 **Báder, E., I. Györkös, P. Báder, M. Porvay, E. Kertészné Györffy, A. Kovács and L. Pongrácz (HU)** Change of udder conformation traits by lactations in a Holstein Friesian herd
- 76 **Baines, J.R. (UK)** Managing the change to automatic milking

- 82 **Rodenburg, J. (CA)** A protocol for training a dairy herd for automatic milking
- 90 **Ipema, A.H. and P.H. Hogewerf (NL)** Effect of a simplification in the entrance and exit procedure for a multiple stall robotic milking system on the cow's time budget for milking
- 99 **Weiss, D., E. Möstl and R. M. Bruckmaier (DE)** The changeover from conventional to automatic milking in dairy cows with and without previous experience
- 100 **Mačuhová, J. and R. M. Bruckmaier (DE)** Diurnal changes of oxytocin release during automatic milking
- 103 **Capelletti, M., C. Bisaglia and G. Pirlo (IT)** Introduction of AMS in Italian herds. Integration and performances in a conventional barn in North Italy
- 111 **Van Dooren, H.J.C., C.H. Bos and G. Biewenga (NL)**
Strategies to improve the capacity of an automatic milking system
- 116 **Reinemann, D.J., Y. van der Vorst, W. de Jong and A. Finnema (US)** Survey of automatic milking systems management practices in North America
- 117 **Svennersten-Sjaunja, K., I. Andersson and H. Wiktorsson (SE)** The effect of milking interval on milk yield and milk composition
- 119 **Gustafsson, M. (SE)** Working time studies in farms with conventional and automatic milking
- 120 **Rasmussen, J.B. and J. Pedersen (DK)** Electricity and water consumption by milking



Ground Floor

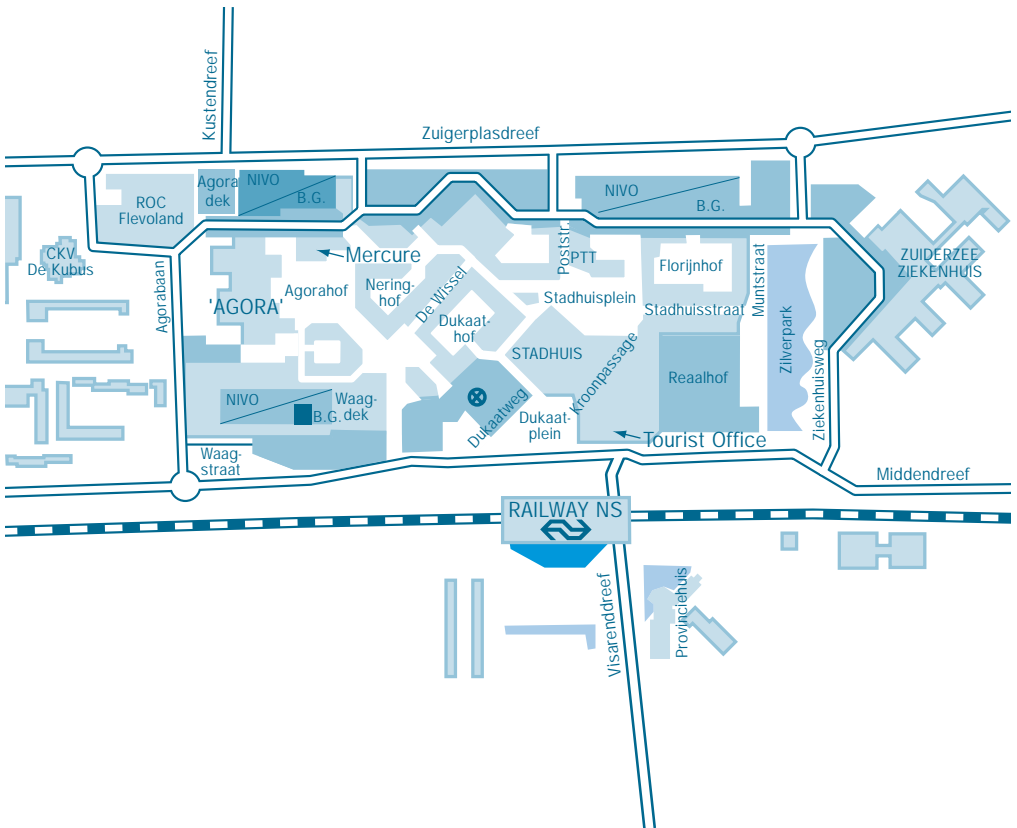


First Floor

General information

Venue

The International Symposium on Automatic Milking takes place in Conference Centre Agora in Lelystad. The Conference Centre is conveniently located in the centre of the city, close to the shopping centre and the railway station.



Lelystad was founded 29 years ago and currently has about 70,000 inhabitants. Since Lelystad is located at the border of the Yssel Lake, it provides many possibilities for water sports, sailing in particular. Lelystad is the seat of the Animal Sciences Group of Wageningen UR and the location of a number of its research divisions, among which the Applied Research Division (the former Research Institute for Animal Husbandry).

Lelystad is the capital of Flevoland, the latest province of the Netherlands. Flevoland was officially founded on January 1, 1986. The establishment of this 12th province was the crowning moment of a massive land reclamation project, which involved a dam enclosing the Zuiderzee (an inlet of the North Sea – today Yssel Lake) and the subsequent creation of five new polders. Thanks to this Zuiderzee project, which took one century to complete, densely populated Holland gained space to house large-scale agriculture, modern towns and villages with much nature and many recreational facilities.

The Netherlands has a mild sea climate. The average daytime temperature at the end of March is 10.6 degrees C, with a wide variation within and between years. The month of March is notorious for its unpredictable weather: it is likely to rain but one has to reckon with some sleet, drizzle or fog as well but on the other hand it may be nice spring weather...

Public transport

There is a direct **rail** connection between "Schiphol" Amsterdam Airport and Lelystad (<http://www.ns.nl/>) with 3 trains per hour in the early morning and in the evening and 4 trains per hour during daytime. Travelling time is approximately 1 hour.

Between Lelystad railway station and Dronten **bus** station (hotel Galjoen) there is a regular bus connection (line 143) and, only during daytime, a "fast" bus connection (Interliner). Departure times of bus line 143 from Dronten are 6.03, 6.33, 7.03,... and so on every half hour until 19.03; then every hour at **.03 until 00.03.

From Lelystad, times of departure are 6.02, 6.32, 7.02,... and so on till 18.02; thereafter every hour at **.34 till 23.34.

Departure times of the Interliner from Dronten are 6.03, 6.33, 7.03,... and so on every half hour till 19.03. And from Lelystad: 6.37, 7.07, 7.37,...and so on until 18.37. Travelling times with line 143 and the Interliner are 30 and 25 minutes, respectively.

Phone numbers for **taxi** service in Lelystad are: +31 (0)320 221618 and +31 (0)320 219195

Hotels

Hotel Mercure Lelystad:
Agoraweg 11
NL-8224 BZ LELYSTAD
Phone: (+31)320-242444
Fax : (+31)320-227569

Hotel Het Galjoen
De Rede 50
NL-8251 EW DRONTEN
Phone: (+31)321-317030
Fax: (+31)321-315822

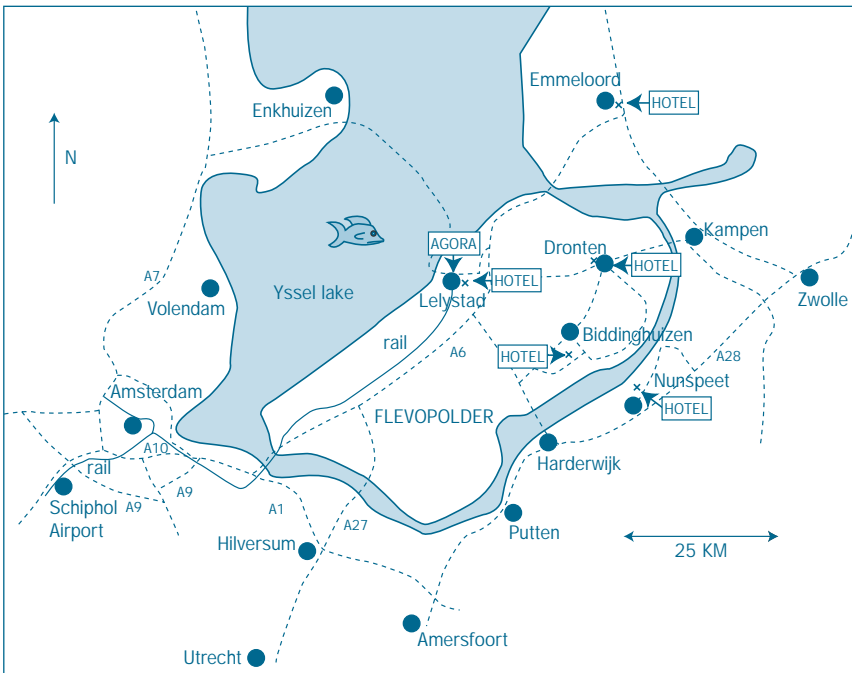
Hotel Van der Valk Emmeloord
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NL-8302 AE EMMELOORD
Phone: (+31)527-612345
Fax: (+31)527-612845

Dorhout Mees
Strandgaperweg 30
NL-8256 PZ BIDDINGHUIZEN
Phone: (+31)321-331138
Fax: (+31)321-331057

Hotel Dennenhoeve
Elspeterweg 14
NL-8071 PA Nunspeet
Phone: (+31)341-260106
Fax: (+31)341-260028

Shuttle bus service, from and to hotel Van der Valk and hotel Dennenhoeve only, will be operational after the Welcome Reception on Wednesday, March 24; before and after the scientific meeting and before and after dinner on Thursday, March 25; before the scientific meeting on Friday, March 26. Travelling times will be about 30 minutes.

For participants in the Satellite Seminar Feeding Management, shuttle bus service will continue after the Symposium.



Registration and information

The desks for registration and information are situated in the lobby of the Conference Centre. The information desk is open for participants and accompanying persons during the entire conference for information on restaurants, location of cash dispensers, restaurants, public transport and other questions.

Badges

Registered participants and accompanying persons will receive an identification badge. This badge is personal and cannot be transferred to others. The badge warrants free access to the venue, meeting rooms, coffee, tea, lunch, dinner, reception and shuttle busses. The badge has to be worn visibly during the symposium activities. Specific badges, giving limited access are available for journalists. Members of the organising committee will be identified as such on their badge.

Scientific secretariat

For all questions regarding oral and poster presentations and the scientific programme, you can contact the scientific secretariat in the speakers room at the conference centre. Here, laptops are available to test presentations. Speakers are requested to hand over their Powerpoint presentation to the scientific secretariat. Moreover, speakers are asked to contact the chair of their session before it starts, to make sure that he or she has the correct information about the speaker.

Poster presentations

Poster presentations are on the balcony of the Conference Centre. Poster stands are numbered. Poster authors can find their number in the programme. Posters for Thursday, March 25, can be set up on Wednesday before 19.00 and after 21.00, and on Thursday before 8.30. They have to be removed on Thursday before 18.30.

Posters for Friday, March 26, can be set up on Thursday between 18.30 and 19.00 and on Friday before 8.30. These have to be removed on Friday before 18.00. Set up material will be handed over at registration, and will be available later on at the registration desk.

Posters will be on display one day. Poster authors are expected to be present on site around lunchtime.

Business presentations

Business presentations by our sponsors will take place in the Atrium. You are kindly invited to pay them a visit.

Accompanying persons

Flevoland is a surprising visiting destination. On the website www.vvfvlevoland.nl you will find all sorts of information about day-trips, museums, boat-trips, wildlife area's, bicycle- and hiking tours and special events.

The office of VV Flevoland is situated near the railway station.

The address is:

Stationsplein 186

8232 VT Lelystad

Tel.: +31 (0)320 243444

If you wish to visit places outside Flevoland, we have the following suggestions:

- Zuiderzeemuseum Enkhuizen

The Zuiderzeemuseum provides a glimpse of the cultural-historical legacy of a period when what is now the country's largest inland lake was still a true sea.

- Amsterdam

One of the most interesting cities of Europe.

- Harderwijk

For tourists, Harderwijk has much to offer. The Dolfinarium is the largest marine animal park in Europe and the historic town centre has a welcoming atmosphere.

Website

All information, including the programme is available on our website www.automaticmilking.nl. The site will be updated regularly till the end of the EU-project, July 1st.

Internet facilities

On the "Koepel terras" an internet island, consisting of three PC's, is available for the participants and accompanying persons. Unfortunately, the Conference Centre is not equipped with fast internet connections yet. In case of people waiting, user time is limited to 15 minutes per session.

Additional proceedings

Additional proceedings can be ordered at the stand of Wageningen Academic Publishers at a special Symposium price of € 50 per copy (normal price € 80). After the symposium, proceedings can be ordered on the website <http://wageningenacademic.com>.

Satellite Seminar Feeding Management

On March 27th 2004, the Applied Research Division of the Animal Sciences Group, Wageningen UR, will organize a satellite seminar "Feeding Management: cow versus herd approach".

The seminar is related to the project "High-tech farm". The emphasis in this farm is put on achieving a high milk yield per cow per worker, thus lowering the cost price of milk. The farm's quota equals 800.000 kg milk and the maximum labour input is around 2500 hours per year. In this project, among others, a prototype of an automated system for individual dairy cow feeding is being evaluated. An individual cow approach in ration composition offers new perspectives for improvement of nutrient utilisation and animal health, while recording of individual feed and nutrient intake gives opportunities to select for feed conversion.

The programme includes four presentations by invited speakers, a business meeting including an excursion to the "High-tech farm" with its prototype individual feeding system. The Seminar will be held at experimental farm "Waiboerhoeve" in Lelystad, the Netherlands.

The language is English. The registration fee is € 245. The programme and additional information are available on the website www.pv.wur.nl/feedingmanagement.

Organisation

Organising Committee



*Albert Meijering
(chairman)*



*Henk Hogeveen
(scientific programme)¹⁾*



*André van der Kamp
(administrator)*



*Kees de Koning
(treasurer and
business liaison)*



*Anita Wolsing
(organisation and
publicity)*

1) by courtesy of Business Economics Group, Wageningen University

Scientific committee

Dr. Henk Hogeveen (NL, chairman)
Dr. Christel Benfalk (SE)
Dr. J. Eric Hillerton (UK)
Dr. Karin Knappstein (DE)
Ing. Kees de Koning (NL)
Prof. Dr. Erik Mathijs (BE)
Dr. Albert Meijering (NL)
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* i.e. Galaxy RMS, Unipuls, Compufeeder and the systems RIC (Roughage Intake Control) and IVOG (Individual Feed Intake Recording)

Lely Industries NV

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Notes

