

## Excellence in dairy cows, yet as stress-free as possible - a contradiction?

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Use of EM technology since 1999 in the field of animal nutrition

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Much is being written at the present time about factory farming. Maximum performance that must be achieved so that the farmers could profit. Stressed animals, increased veterinary costs, shortened life span, only foods instead of "life" medium, etc. are just a few keywords which are used to describe it. Is it no longer possible to produce agricultural products with healthy animals? It raises the question of whether the animal health and thus the animal comfort can be maintained or even improved with the use of EM technology.

For this purpose we decided to use Em technology on a dairy farm with Holstein cows. The trial was called Operation Fox Roland Wolhusen in Central Switzerland, where the EM technology has been used for 4 years.

### Calf-rearing and feeding:

During the first 2.5 months of life, the calves get totally 250 liters of milk. 14 days 5 liters of milk per calf and day, then 4 liters per calf per day. Concentrated feed and total mixed ration (TMR) as in the lactating cows are from the first Week of life, offered freely available. Round up the calves TMR and summer grazing receive daily. Once the cattle are pregnant, they spend the summer in the mountains.

### Feeding of dairy cows:

The milk will cool the whole year total mixed ration (TMR) with hay, alfalfa hay, corn, grass and sugar beet pulp silage. Also, the hay is mixed into the TMR, so that only the complete mixed ration is set before. Below is a compilation of the ration and its contents.

	kg FS	kg TS	Gehalte/kg TMR:	
ventilated hay	2.0	1.8	NEL (MJ):	6.9
alfalfa hay	3.0	2.6	APD (g):	102
Corn silage (whole plant)	17.0	5.6	APDN (g):	110
Ensiled beet pulp	17.0	3.2	PME (g):	80
grass silage	20.0	7.0	PMN (g):	101
Soybean meal 48%	1.0	0.9	MPP to NEL (kg):	39.8
Corn gluten 60%	0.6	0.5	MPP for APD (kg):	36.6
Rumen stable fat	0.4	0.4	MPP for APDN (kg):	40.1
<b>Total:</b>	<b>61.0</b>	<b>22.0</b>		

Abb. 1: Rationengestaltung

The ration is prepared and mixed with the every other day diet mixers. The mixing ration is presented to the cows three times daily. The concentrate additions are made each about an hour after the forage allocation. It is limited to 4 kg per animal per day. In cows in Galt phase only bad hay or pasture is offered in the first 3 weeks. Thereafter, the same mixed ration is fed as for lactating cows. This with the aim that the population of the rumen flora is prepared for the digestion of the starting phase feeding.

### Management and Accounting

The company is well established and has a very good management. To enhance cow comfort of the warehouses with long straw is abundantly interspersed. The animals are tethered, but received daily doses of exercise. For better air quality, a large room fan (48,000

m<sup>3</sup> of air exchanges / hour) was built 5 years ago. The animals are milked with pipeline milking three times a day since 2001.

### Use of EM technology:

#### Calves, heifers:

The calves administered since 1999 Euro for first settlement of the gastrointestinal tract as possible with the first milk. After the calves received during the first 3 weeks regularly Championship in the milk. The rearing feed supplement enriched with 1% Bokashi. In addition, the feed fed silage treated with EM.

#### Dairy:

Since spring 2001, the grass, the corn and the sugar beet pulp treated with an officially audited silage on the basis of EMA (NH 708 uroSIL). The dosage is about 1.5 liters per m<sup>3</sup> silo. In addition (especially in the initial phase) are added regularly EMA 1 dl per cow per day in the mixer with stressful situations. After birth, the cows will be offered in buckets of warm water freely available. Again, EMA is added (about 1 dl in the first bucket).

### Results:

#### Heifers:

The heifers are extremely grow well and develop well. The rumen development is better than before the EM use, according to the superintendent. A large rumen volume is important so that the cows at all are later able to exploit as much forage.

The following table shows the development of First Calving Age over the last 7 years:

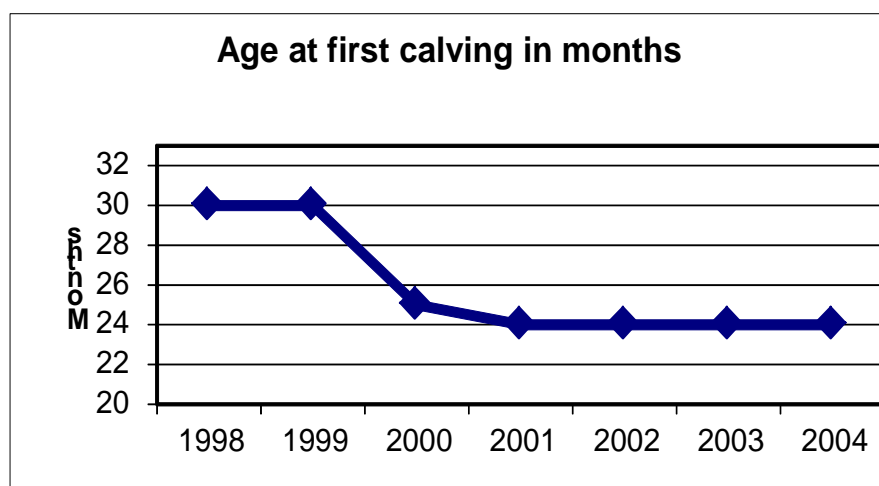


Figure 2: Development of First Calving Age

It turns out that with the intensive feeding and the use of EM technology, at first calving could be lowered. It is now constant at the desired level of 24 months.

#### Dairy cows:

According to the Betriebsleiter the cows silage treated with EM eat very much. Thus, the basic food consumption is also higher.

From scientific studies have shown that the use of live yeast in dairy cattle feeding a pansenstabilisierender effect can be observed. Since we assumed a similar effect with EM-treated silage was their feeding waived after the change to the use of buffers and live yeast. The basic feed consumption remained the same and the milk components did not change. Since then dispense with the use of buffers, although the diet with these high amounts of silage not sure is ideal for a ruminant.

Below is a table showing the trend of the most important performance parameters:

Year	Milk Yield kg	Milk Components			Service Period Days	Number of inseminations per successful reservation	Vet Cost per cow (Fr)
		Fat %	Protein %	Cell Number			
1998	7232	4.5	3.3	189'000	149	3.0	
1999	7441	4.6	3.2	204'000	177	3.3	
2000	8695	4.5	3.2	184'000	153	3.1	286
2001	9927	4.5	3.3	191'000	150	3.3	320
2002	11775	3.8	3.2	132'000	93	1.7	202
2003	11706	3.9	3.2	139'000	120	2.1	217
2004	11721	3.7	3.1	122'000	125	2.2	

Figure 3: Evolution of the performance parameters in dairy cattle

From the table it can be seen that (1999/2000) of the first performance boost could be made the switch to TMR feeding in winter. With the year-silage feeding (from winter 2000/2001) the milk yield could be increased, especially in the summer time. With the three-time milking and the use of EM technology in the silage (from 2001), today's level of performance could be achieved and maintained.

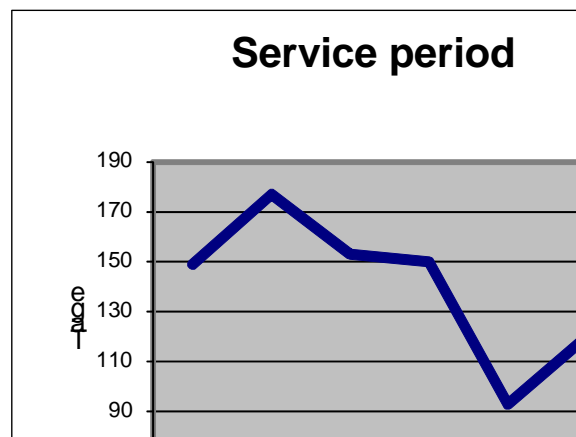
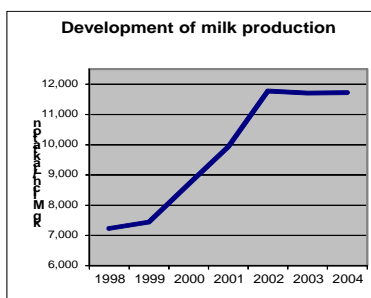


Figure 4: Development of milk output - Figure 5: Development of the service period

By combining the measures described above could be achieved despite the power increase, the fertility data could be improved. The number of inseminations per successful occupancy could be greatly reduced. Thus, the service period decreased (time from calving to successful documents). By milking three times per day the udder is not as full. As a result, the udder is mechanically less irritated and not reduced milk production. The cows can keep the milk better and we suspect that this cell numbers were reduced.

#### Cost:

The EM-costs amount per cow per year to approximately CHF 38 -. Because the use of EM on the Pansenpufferung (approx. CHF 25 -) and the use of live yeast (about £ 22 -) can be omitted, these costs could be more than saved.

The reduced veterinary costs and the reduced number of inseminations per successful occupancy improve on this operation, the financial result even further.

#### Summary:

This operation shows very well how the EM technology works. It is a tool that can be an ideal complement to the existing knowledge. In addition to the EM technology were also many measures taken in the area of dairy farming (all-silage feeding, TMR, intensive rearing feeding, fresh air through the Greater fan loyalty with one long straw) on this operation. Through all these measures, the conditions for the animals were improved, which has finally beigeholfen to this performance.

Despite some massively increased capacity (from 7,200 kg to 11,700 kg of milk per cow per lactation), the fertility data (number of inseminations per successful occupancy, service period) could be improved. In addition, the veterinary costs could be reduced.

Economically, approximately CHF 38 per cow per year are - for the EM technology used. Simply by reducing the veterinary costs and reduced repeat inseminations these costs will be recorded again at the latest.

The interplay now shows that the daily operations and the setting of the Superintendent family have been affected by EM. Additional effects, such as less-smelling manure, less thick cover on the slurry silo, more interested in the natural cycles, use of EM in the home and garden, are just a few innovations in this operation.

