

Automatic milking and free fatty acids

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Outline

- Introduction
 - Automatic milking
 - Background FFA and lipolysis
- Material and methods and results
 - Milking frequency
 - Technical factors
 - Farm factors
- Recommendations

1950-2004

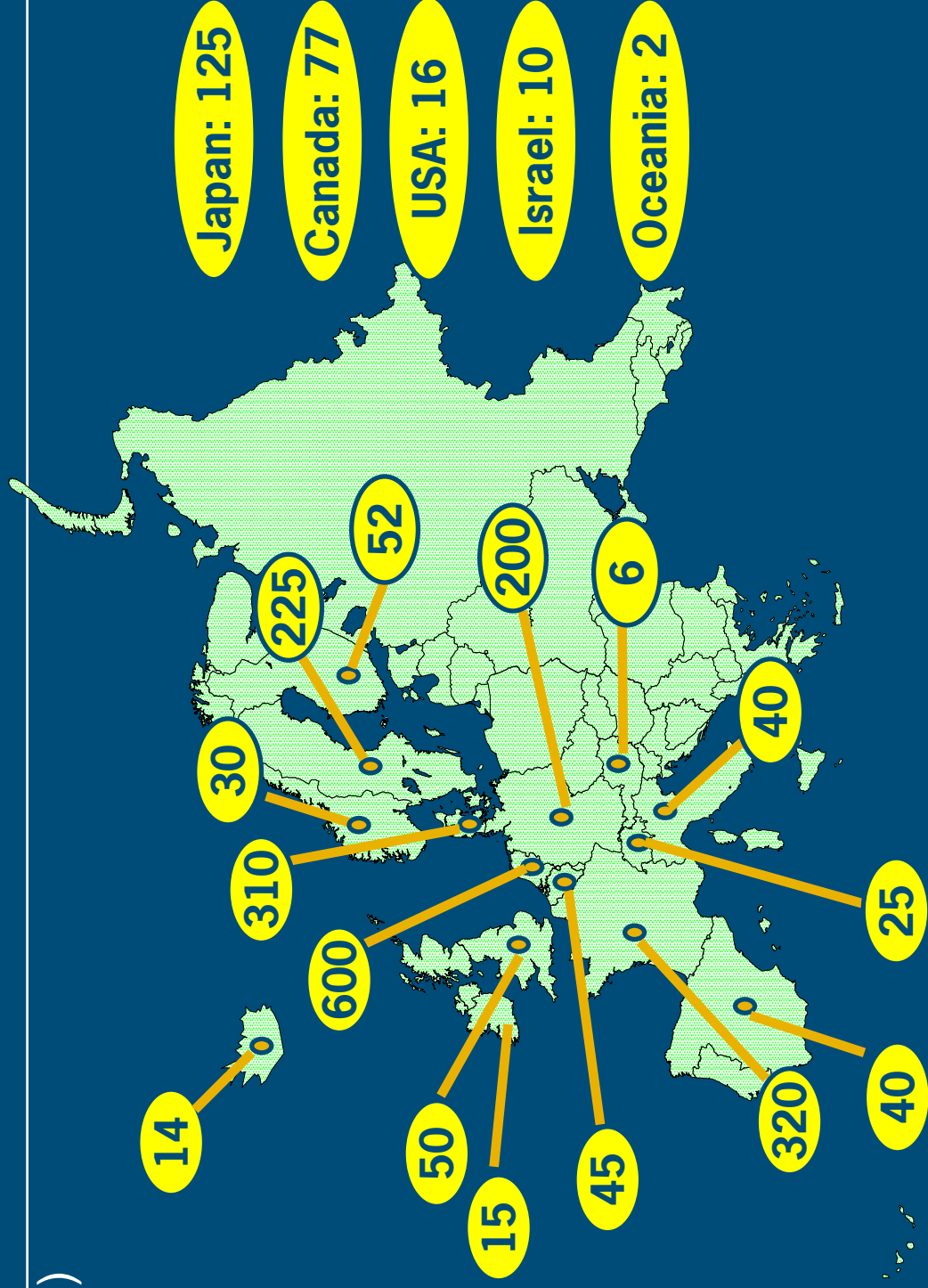


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Farms with AM world wide

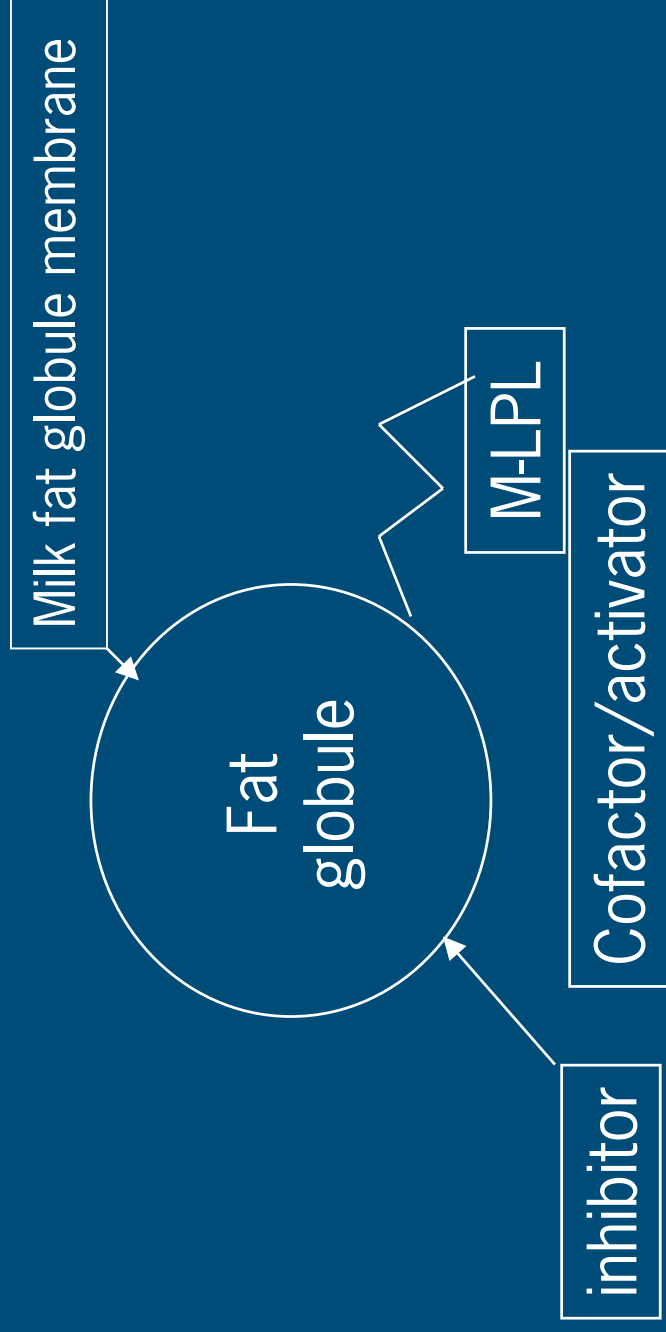
(Dec. 2003)



Background FFA and lipolysis

- Off- taste of dairy products (rancid)
- Lipolysis: release of free fatty acids (FFA) by action of enzyme (mLPL)
- Problems with high FFA:
 - Pipeline systems (1970-1980)
 - Automatic Milking (>2000)

Mechanism of lipolysis



“Spontaneous” lipolysis

Induced lipolysis: damage of membrane

Spontaneous lipolysis

- More frequent milking
- End of lactation
- Hormonal influences
- Feed

Induced lipolysis

- Excessive mixing of air and milk
 - Blind pumping of milk pump
 - Stirring half above milk level
 - Air leakage
- Freezing of milk

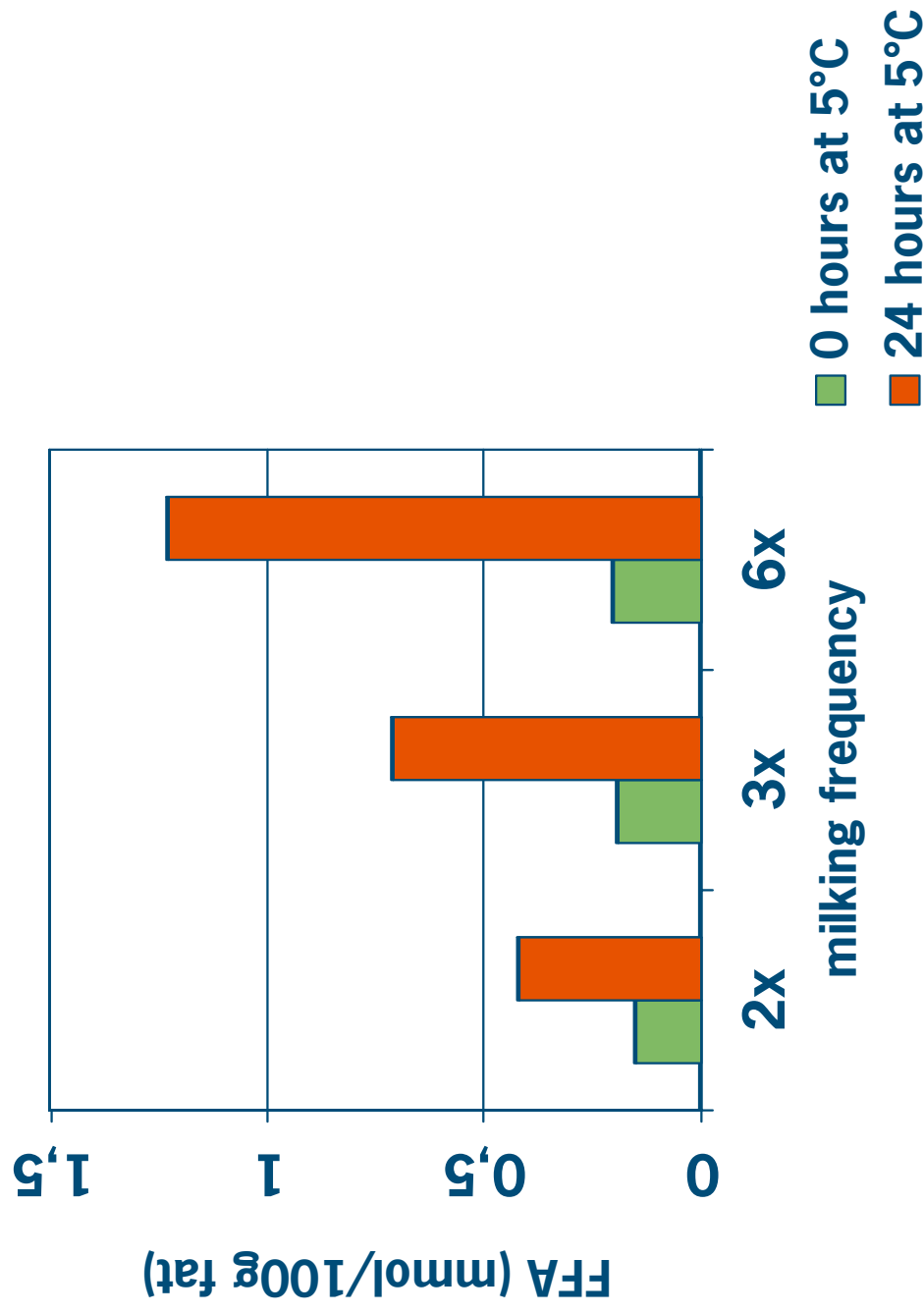
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Aim of the study

- Causes for increased FFA levels:
 1. More frequent milking
 2. Technical factors
 3. Farm aspects
- Combination of all three causes?

1. Milking frequency



2. Technical factors

- Conventional
- AM systems

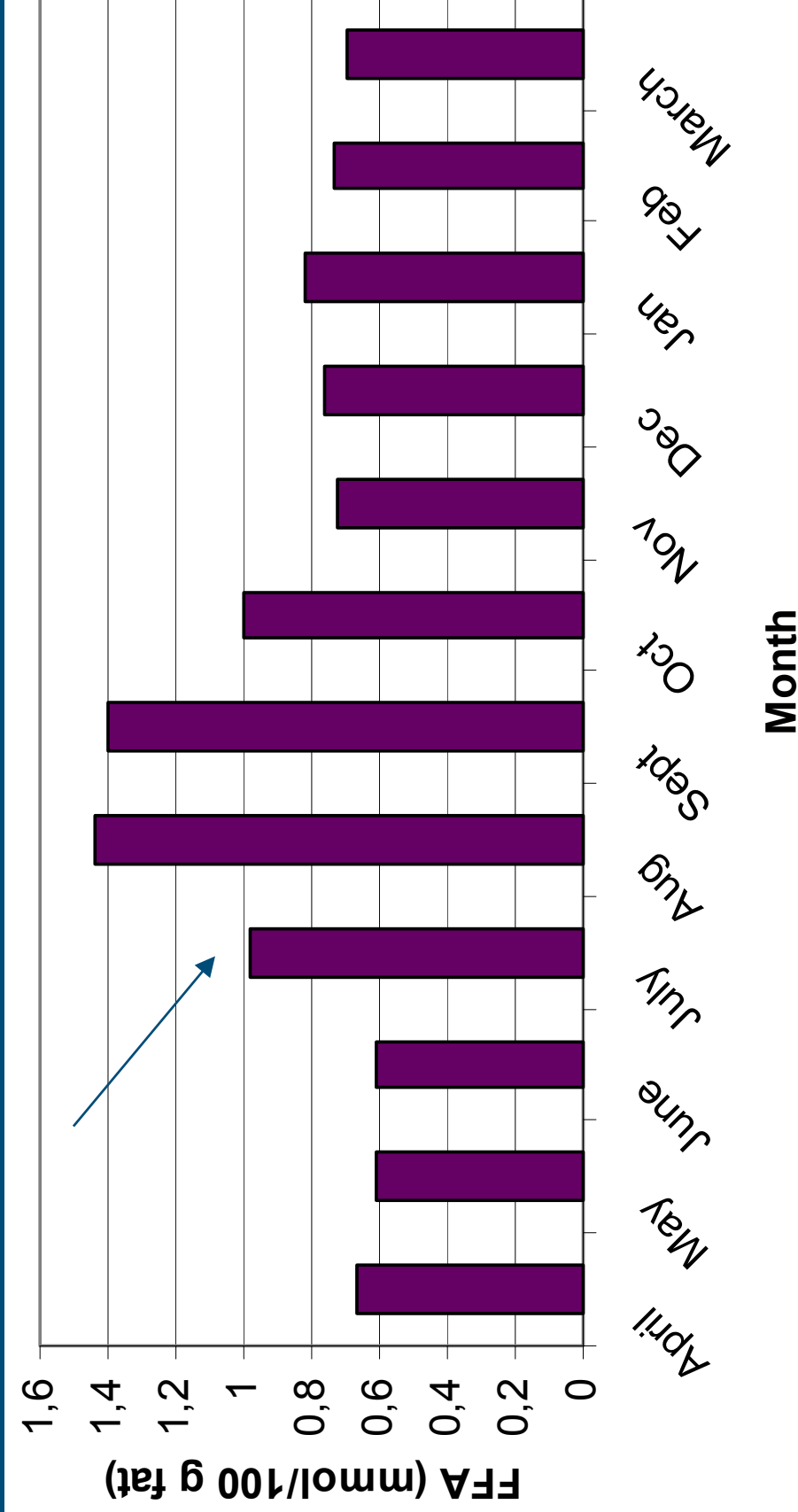
2. Technical factors

FFA (mmol/100 g fat)	Milking system	Before passing system	After passing system	Increase
Test 1				
Conventional		0.43 ^a	0.50 ^a	0.07 ^a
AM 1		0.42 ^a	0.58 ^b	0.16 ^b
Test 2				
Conventional		0.58 ^a	0.65 ^a	0.07 ^a
AM 2		0.45 ^b	0.65 ^a	0.21 ^b

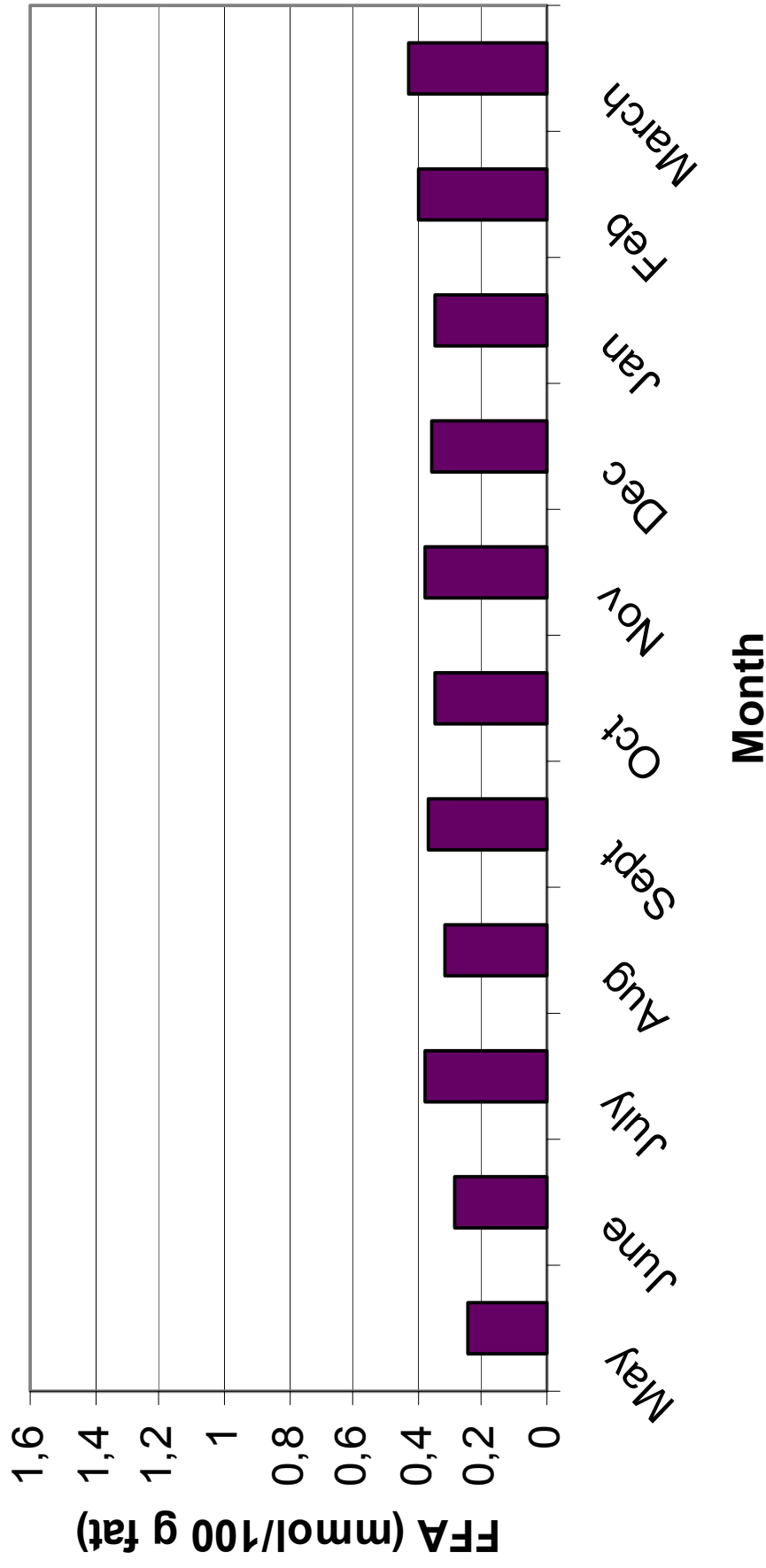
3. Farm factors

- Variation of FFA during the year
- AM and 3x farms with high and low FFA levels

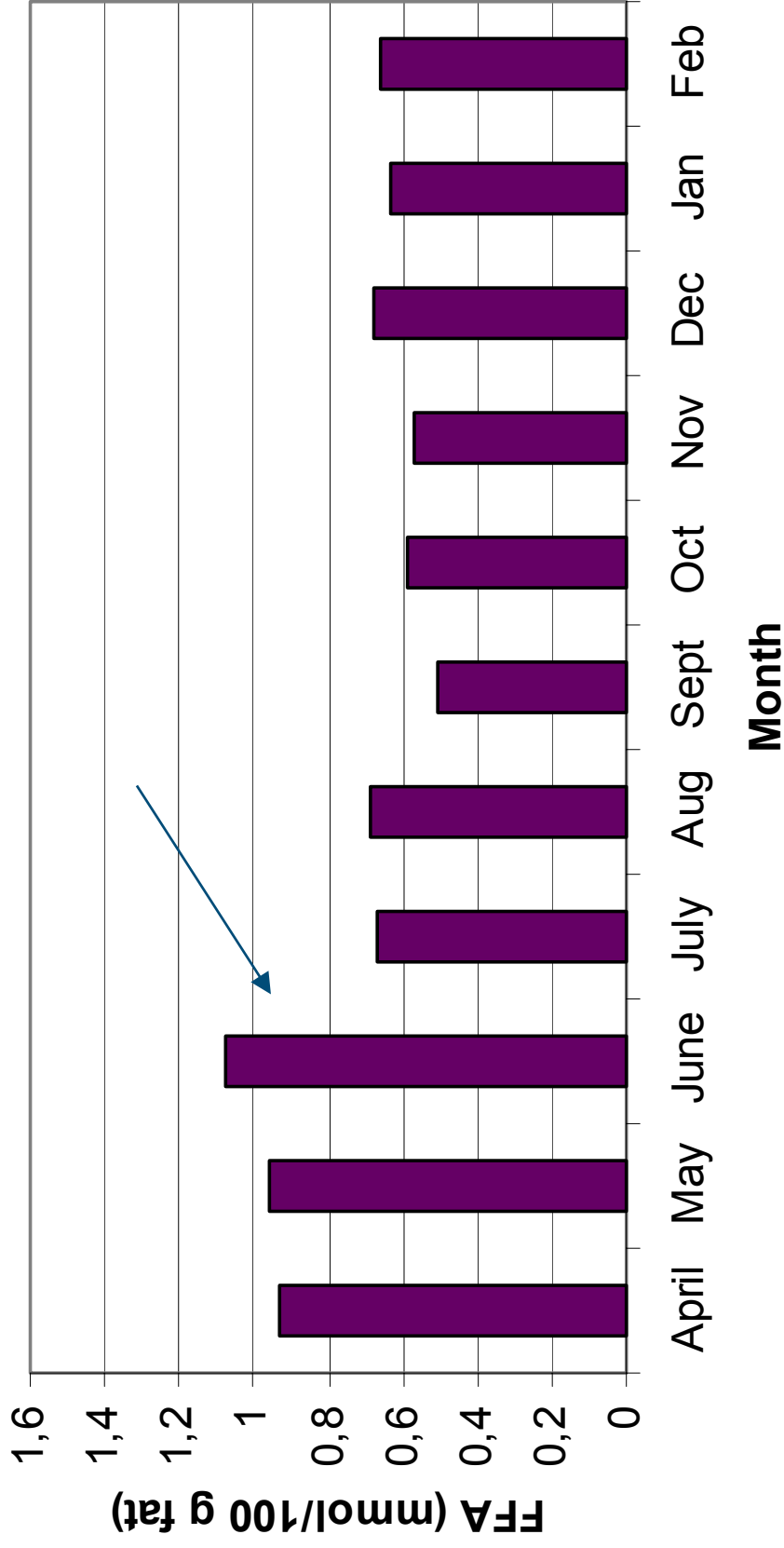
3. 3x farm with high FFA level



3. AM farm with low FFA level



3. AM farm with high FFA level



3. Farm Factors

- Milking frequency is very important
- AM settings: part of management
- Feeding regime? Energy shortage? Higher FFA
- Control of cleaning system: lower FFA
- > 3,50% protein: lower FFA

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Recommendations

1. Milking frequency

Do not milk too often (> 6 hours interval)

2. Technical factors

Influenced by susceptibility of milk and milking system
Check equipment on air leakage and blind pumping

3. Farm factors

Ongoing research for causes high levels

Research on susceptibility necessary