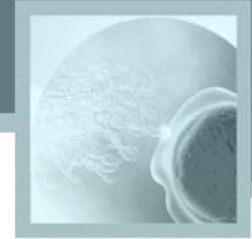


Performance evaluation of the SQA-Vb automated sperm quality analyzer for bulls in a multiphase trial

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³Medisoos Veterinary Practice, Israel

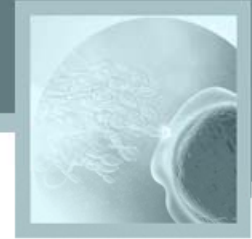
Study Overview



The goal: Correlating fertility outcomes to insemination with varying levels of progressively motile sperm cells

The trial was performed using a new technology, the SQA Vb - automated Sperm Quality Analyzer.

Study Overview: 3 Phases



Phase 1:

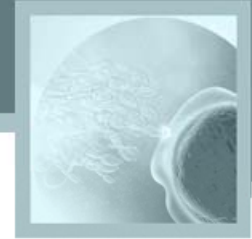
Validate the accuracy and precision of the SQA-Vb (Sperm Quality Analyzer for Bulls)

Phase 2:

Produce frozen straws for the experimental groups

Phase 3:

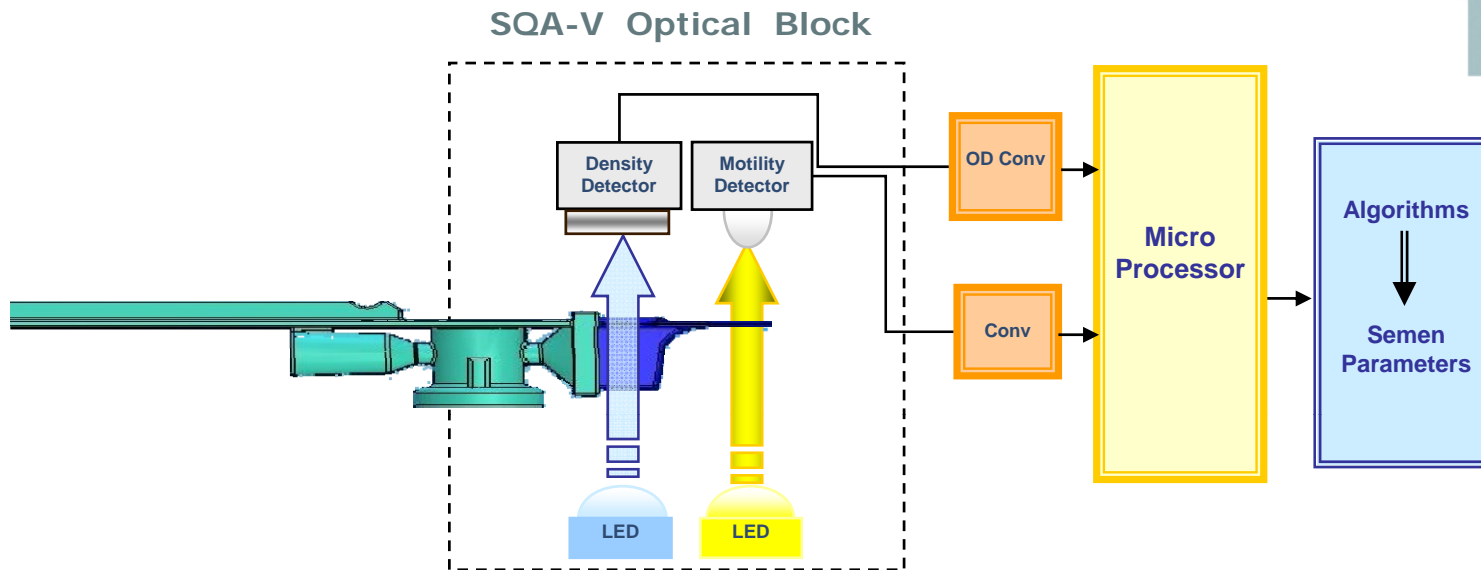
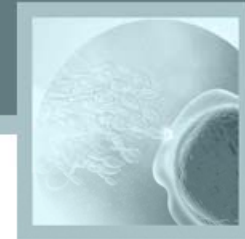
Inseminate and analyze fertility outcomes



Phases 1 & 2

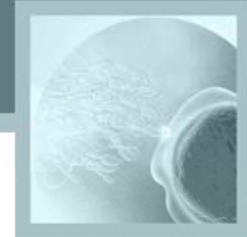
- **Validating the accuracy and precision of the SQA-Vb (sperm quality analyzer for bulls)**
- **Preparing AI doses based on progressively motile cells (post thaw) in commercial field conditions**

SQA-Vb Technology Overview



- **CONCENTRATION:** Optical light absorption & reflection is measured as an infra-red beam traverses the seminal fluid
- **MOTILITY:** Modulations in the light source (caused by moving sperm cells) are measured

SQA-Vb: Sample Preparation



STEP #1



Dispense 2ml testing medium

STEP # 2



Aspirate 100µl semen



STEP #3



Mix thoroughly

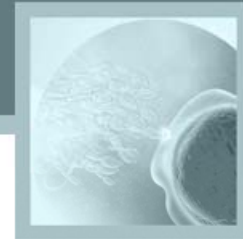
STEP # 4



Aspirate sample into testing capillary

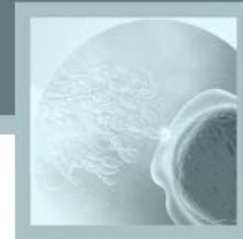


SQA-Vb: Reported Parameters



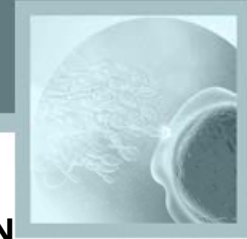
CONCENTRATION	Total Sperm Concentration (millions/ml)
MSC	Motile Sperm Concentration (millions/ml)
PMSC	Progressively Motile Sperm Concentration (millions/ml)
MOTILITY %	% of Motile Sperm per ml
PROGRESSIVE MOTILITY %	$PMSC / \text{Total Sperm Concentration} * 100$
MORPHOLOGY	% of morphologically normal cells/ml
VELOCITY	Average velocity of progressively motile cells (microns/sec)

PHASE 1: SQA-Vb Validation

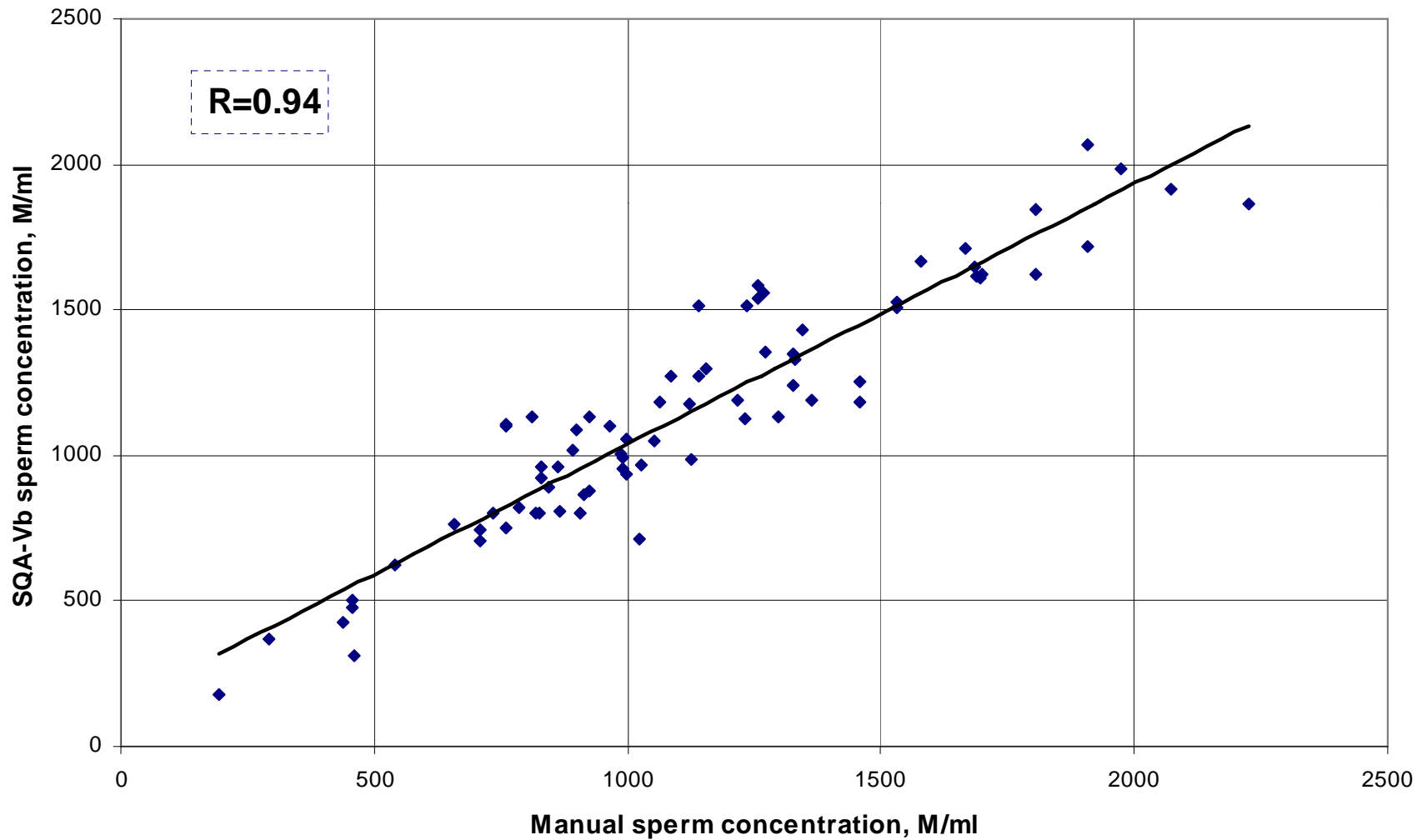


Sample Type	Semen Parameter	Precision CV, %	Correlation to Manual Method, r	Sample Range
Fresh Semen n=101	Concentration, 10⁶	2.4	0.93	206-1900
	Motility %	4.1	0.81	4-99
	Progressive Motility %	8.0	0.75	0.0-97
	Velocity, mic/sec	9.9	0.81	0-70
Frozen Semen n=30	Concentration, 10⁶	4.7	0.99	6-130
	Motility %	5.6	0.90	32-76
	Progressive Motility %	6.0	0.71	15-43
	Velocity, mic/sec	3.6	0.86	0-70

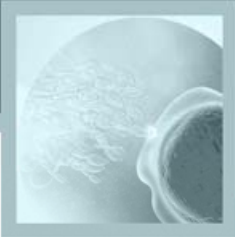
Concentration Correlations-FRESH Samples



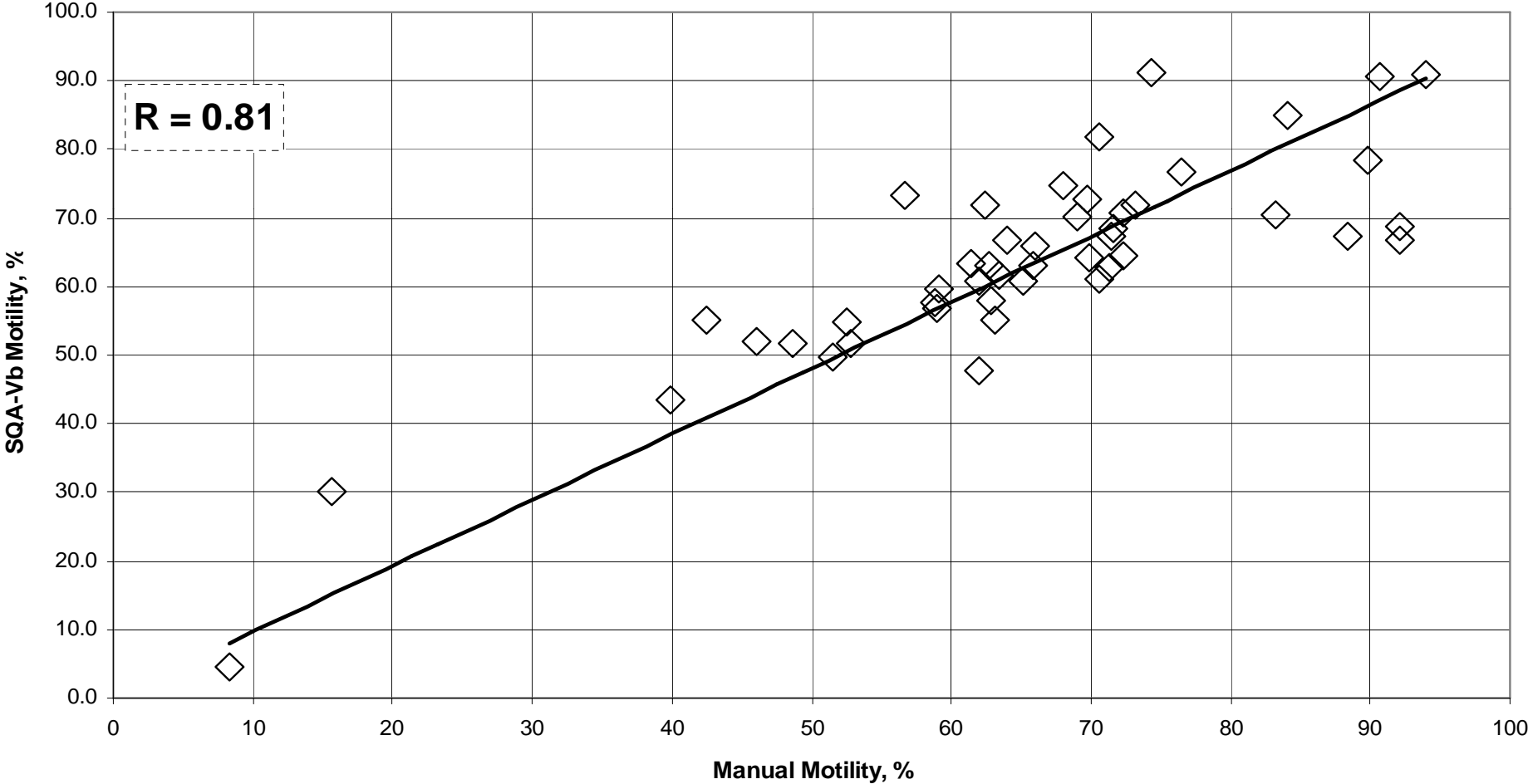
CORRELATION BETWEEN SQA-Vb & MANUAL SPERM CONCENTRATION IN FRESH SAMPLES



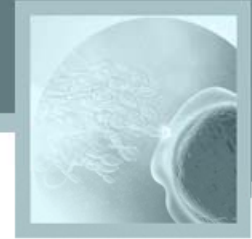
Motility Correlations: FRESH Samples



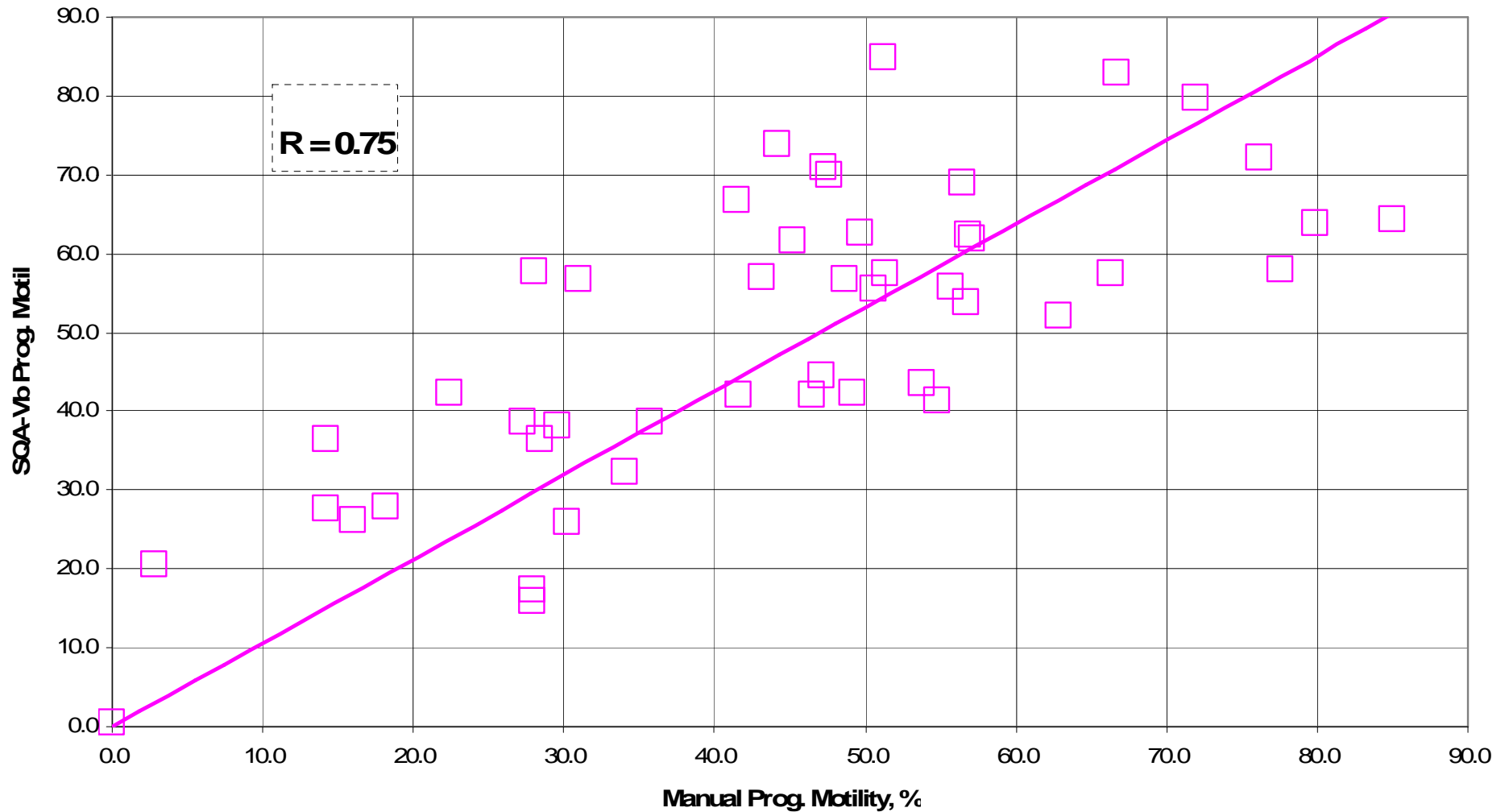
SQA-Vb AND MANUAL MOTILITY CORRELATION IN FRESH SAMPLES



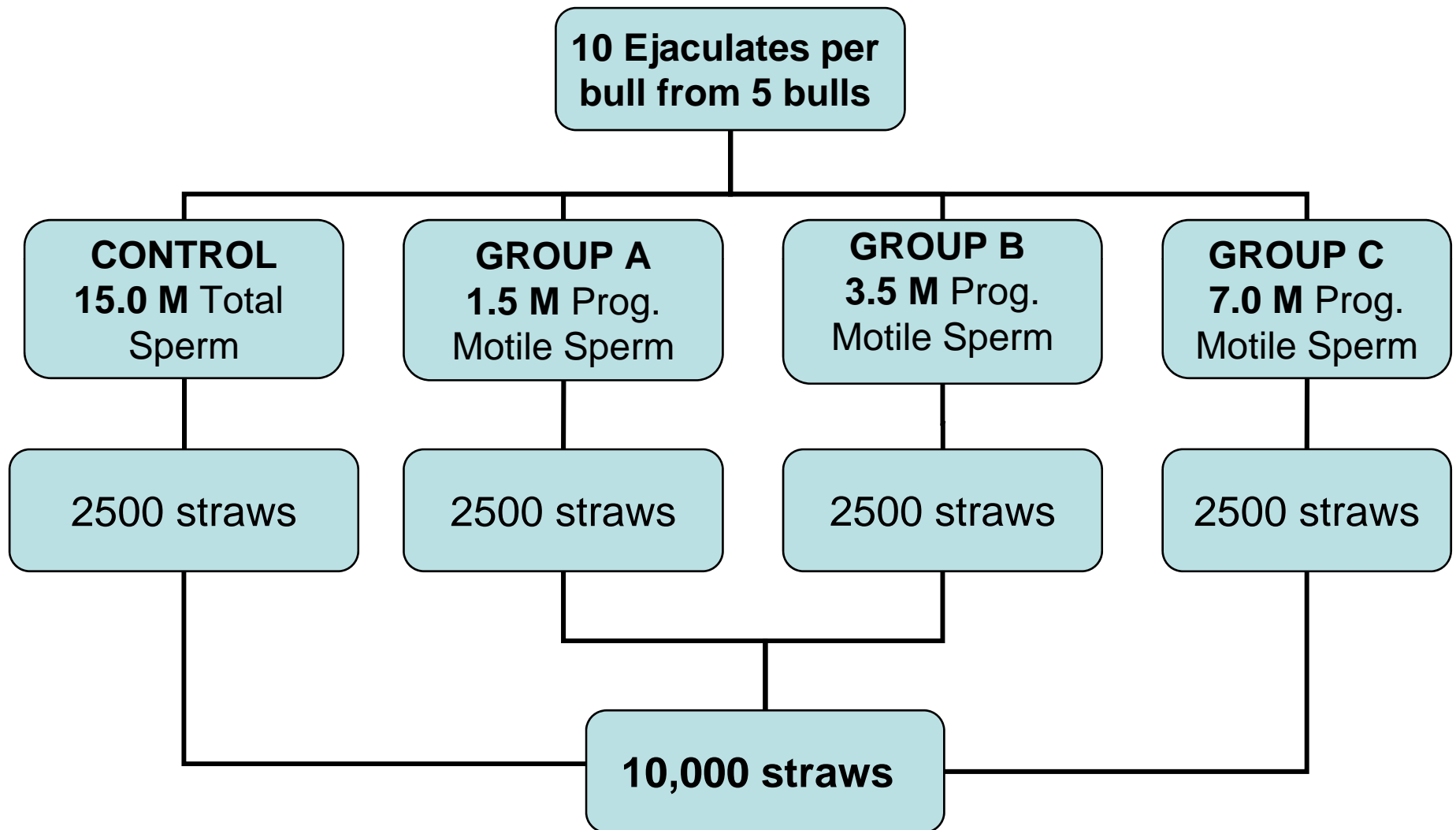
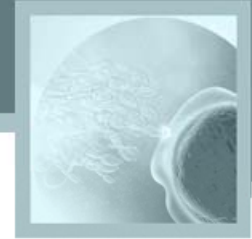
Prog. Motility Correlations: Fresh Samples



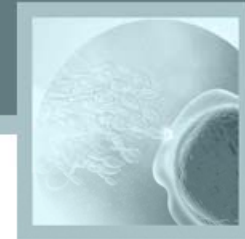
SQA-Vb and MANUAL PROG. MOTILITY CORRELATION IN FRESH SAMPLES



PHASE 2: Trial Structure

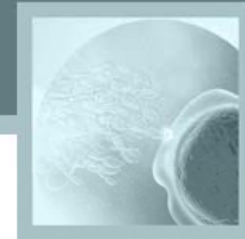


Dosing Instructions by Bull/Group



Bull	Group	Dosing Method	Avg. Prog. Motility% Loss	Target	Freezing Loss Factor	# of Sperm Cells/Dose, M
AISE	A	Prog motile	71%	1.5	3.46	5.2
AISE	B	Prog motile		3.5		12.1
AISE	C	Prog motile		7		24.1
AISE	Control	Total cells	NA	15	NA	15.0
LIKER	A	Prog motile	56%	1.5	2.26	3.4
LIKER	B	Prog motile		3.5		8.0
LIKER	C	Prog motile		7		15.9
LIKER	Control	Total cells	NA	15	NA	15.0

SQA-Vb: Dosing Options



Dosing Set-up

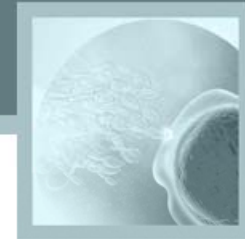
SAMPLE DATA		
Bull ID	<input type="text" value="7164"/>	Bull Name <input type="text" value="Lemon"/>
Herd #	<input type="text" value="1234567890"/>	Date <input type="text" value="25/09/2005 12:18"/>

AUTOMATED TEST RESULTS			
Semen Volume [ml]	<input type="text" value="6"/>	MSC [M/ml]	<input type="text" value="883.1"/>
Sperm Conc. [M/ml]	<input type="text" value="1824.6"/>	PMSC [M/ml]	<input type="text" value="237.1"/>

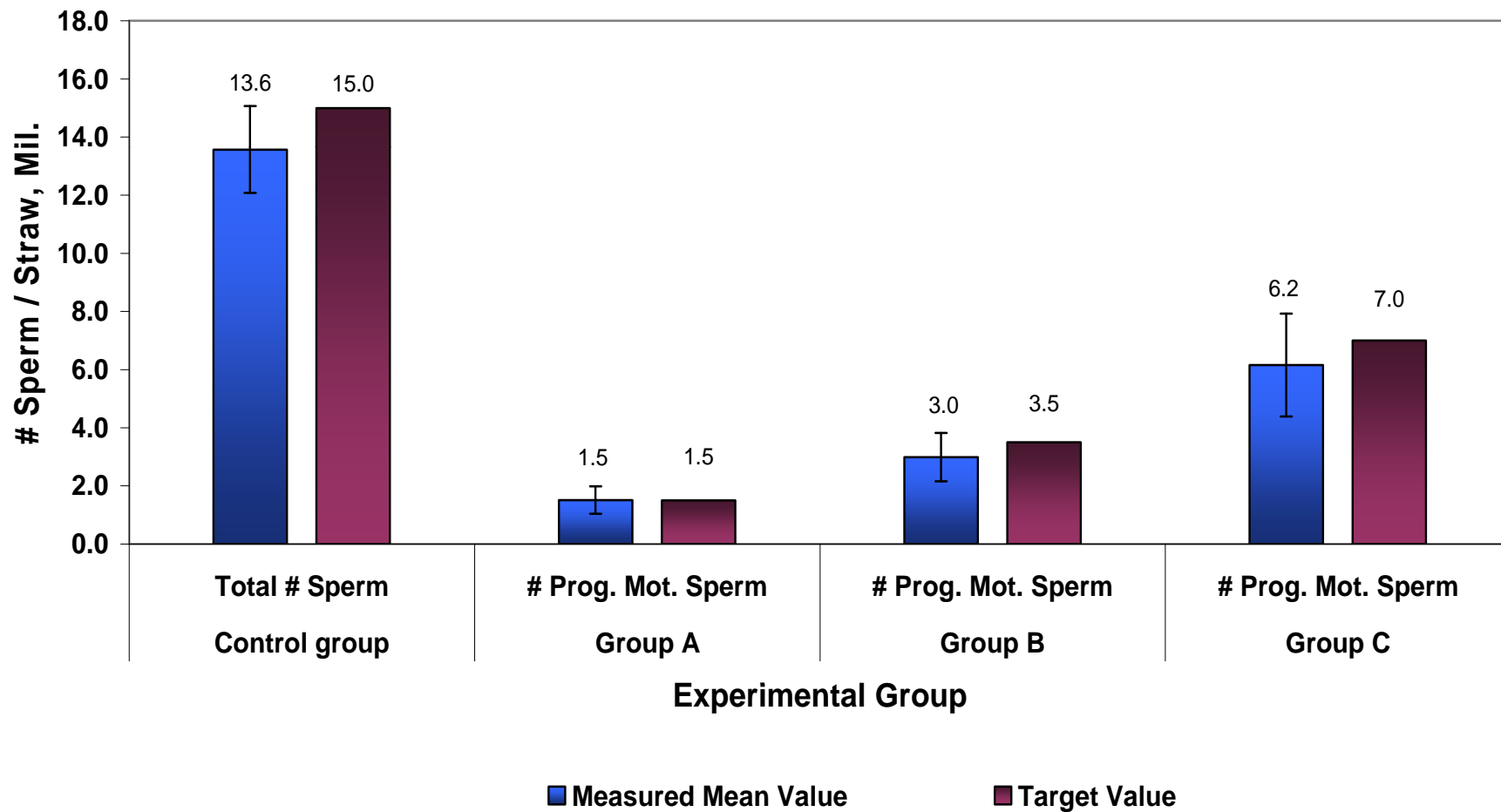
DOSING SET-UP	
Dosing Method	<input type="text" value="Total Sperm #"/>
Dose Volume [ml]	<input type="text" value="Total Sperm #"/>
Target # Sperm [M/dose]	<input type="text" value="20"/>

DOSING RESULTS		
Extender Volume	Total Volume [ml]	Number of Doses [#]
<input type="text" value="128.6"/>	<input type="text" value="134.5"/>	<input type="text" value="538"/>

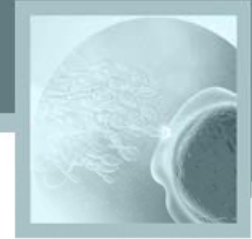
PHASE 2 : RESULTS



Phase 2 Final Results : Measured Mean Values +/- Standard Deviation vs. Target Values in Post Thaw Straws

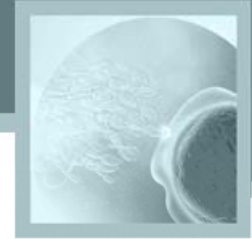


CONCLUSIONS



- The SQA-Vb is an accurate and precise instrument for the analysis of bovine semen.
- Preparing doses based on Progressively Motile cells per dose can be done in field conditions.
- The clinical outcome of dosing by Progressively Motile cells remains to be tested in Phase 3 of the trial.

QUESTIONS



Thank you for your time....