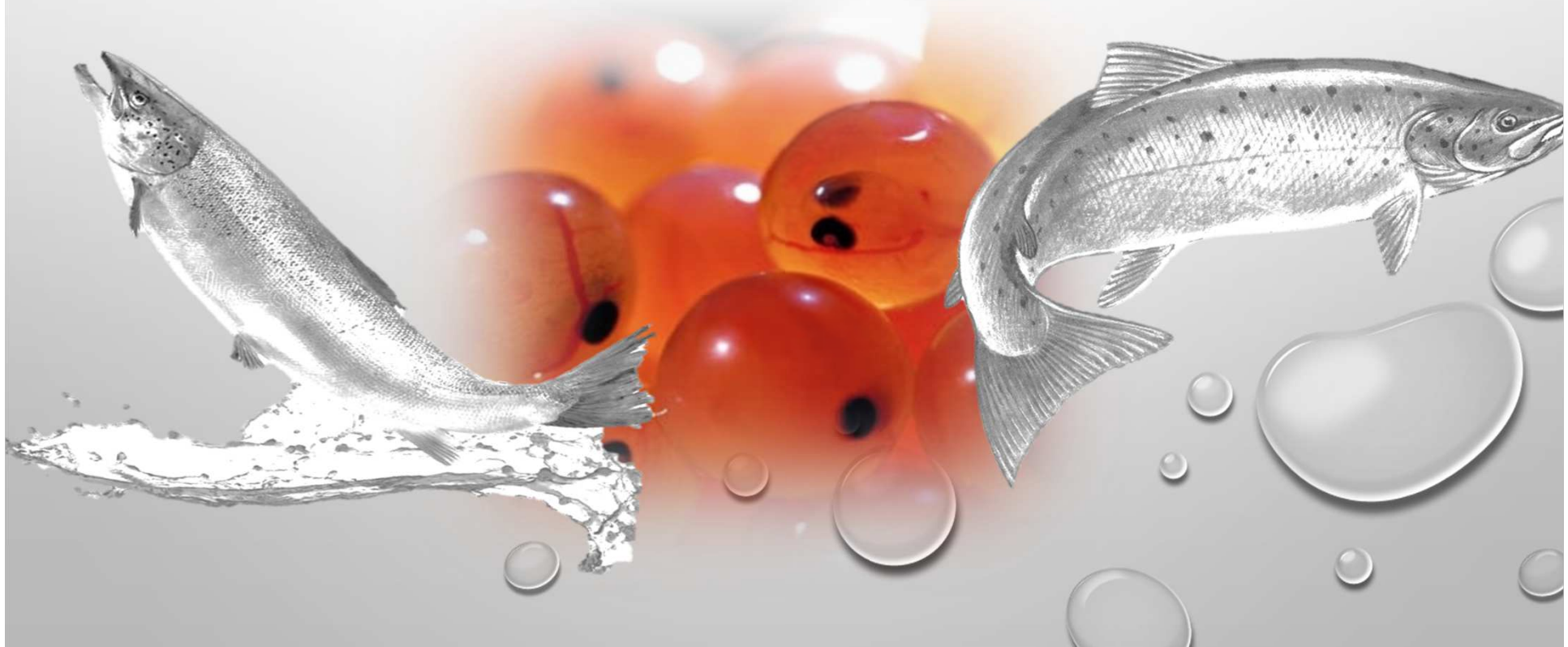


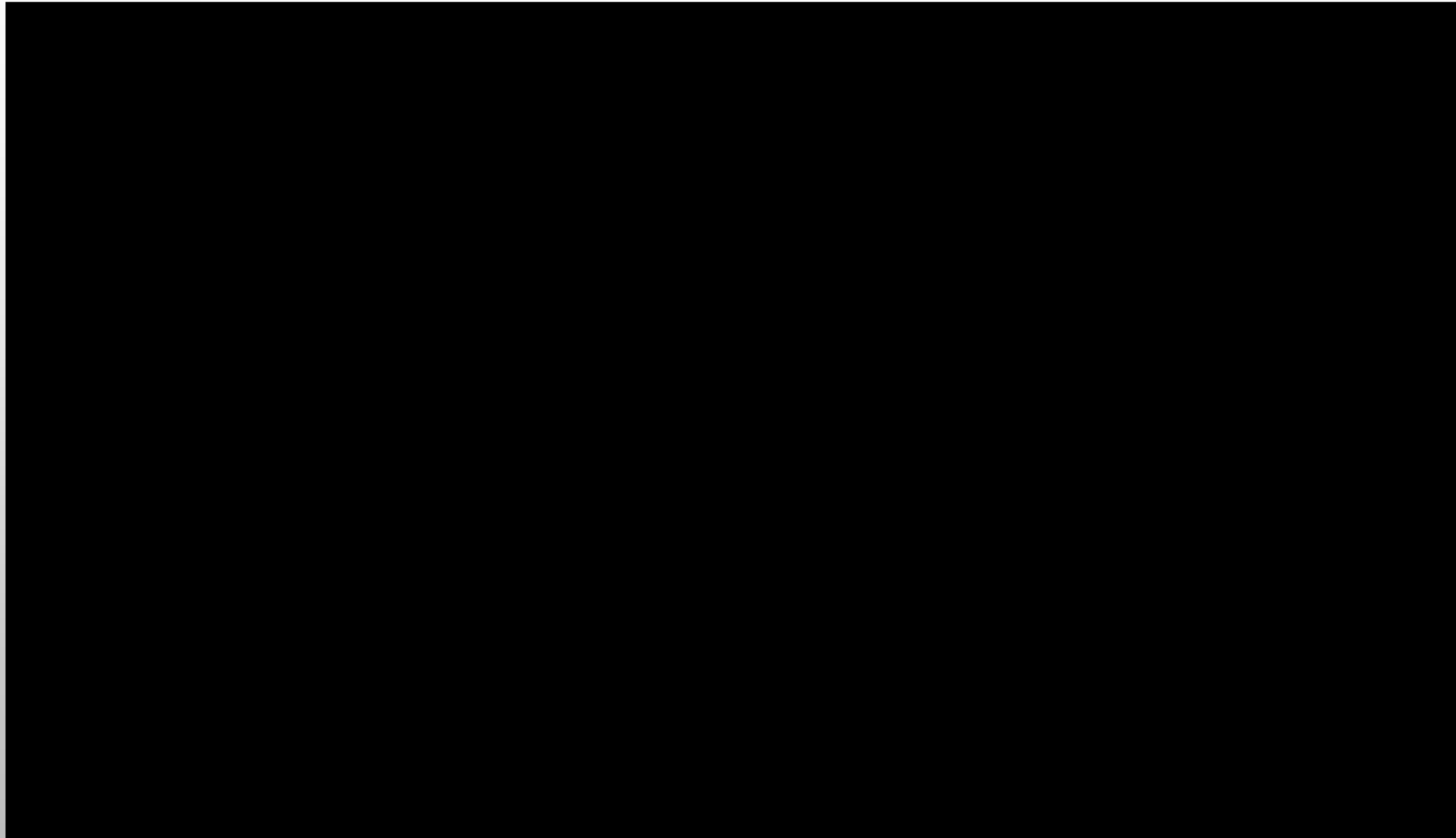


IMV Technologies

Aquaculture Range



IMV Technologies - From France



Fish Reproduction Technologies



EGGS-SORTING
QuickSorter ProSorter



**SEXING
MATURATION**
Exapad



**MILT
OVOCYTE**
StorFish
OvaFish



FERTILIZATION
ActiFish



1

2

3

4

5

7

8

9

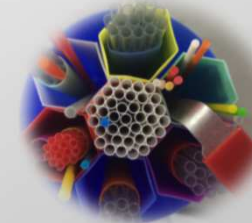
SEMEN FREEZING
Freezefish



SEMEN FREEZING
Digitcool



SEMEN PACKAGING
Straws



SEMEN PACKAGING
Isevo/ MRS4



SEMEN ANALYSIS
IVOS / EASYCYTE





CRYOPRESERVATION



CRYOPRESERVATION PROCESS AUTOMATION



Sperm collection

Sperm Quality Analysis

Dilution

Sealing & Filling


Freezing

Storing

Thawing

CASA Systems

- IVOSII
- CEROS II




Automated dilution

- Sperm Dilutor

Automated filling&sealing machines

- MRS1
- ISEVO



Programmable freezers

- Digitcool
- Minidigitcool



Large Capacity Tanks

- RCB500

Multiple Straw Emptier

- Emtpyx



EXTENDER & MATURATOR



CRYOPROTECTANT



ACTIVATOR



IMV MEDIA



STORFISH

- Extender
- Maturation
- Preservation

Concentrated 10x



FREEZE FISH

- Cryoprotectant mix for salmonids

Ready to mix



OVAFISH

- Cleaning solution for eggs

Concentrated 10x



ACTIFISH

- Activating solution for fertilization

Concentrated 10x

MILT CONCENTRATION



Microscope Counting

- Time consuming
- Limited nr fields counted
- Human counting error

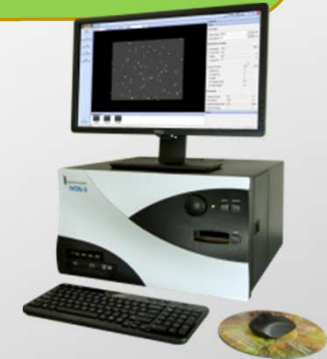
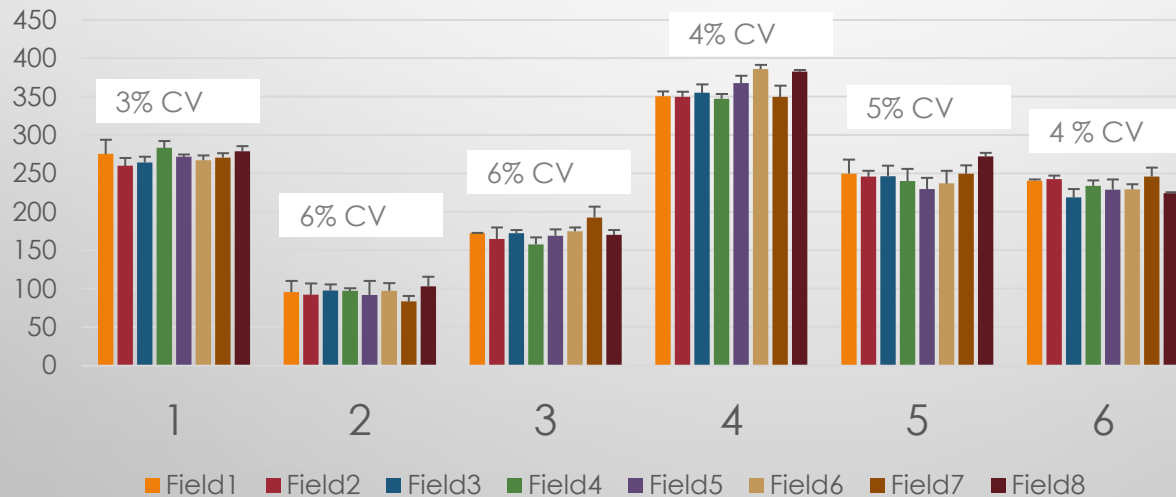
Photometer

- Fast results
- Easy to do
- Estimation
- Range variation

CASA Systems

- Fast process
- Highly accurate concentration
- High reproducibility (<5% CV)
- Report, video and pictures for each sample.

Spermatozoa total count per male and per field



- <5% Variation Coefficient (4 replicates x 6 males)
- Using 4 chambers Leja® slide and dilution of ActiFish at 1:9 (20 frames/field)

MILT MOTILITY %

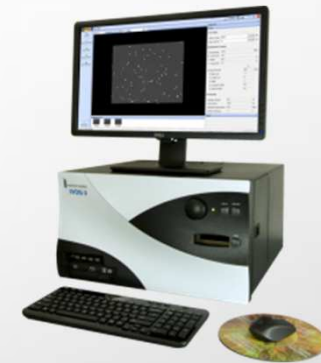


Microscope

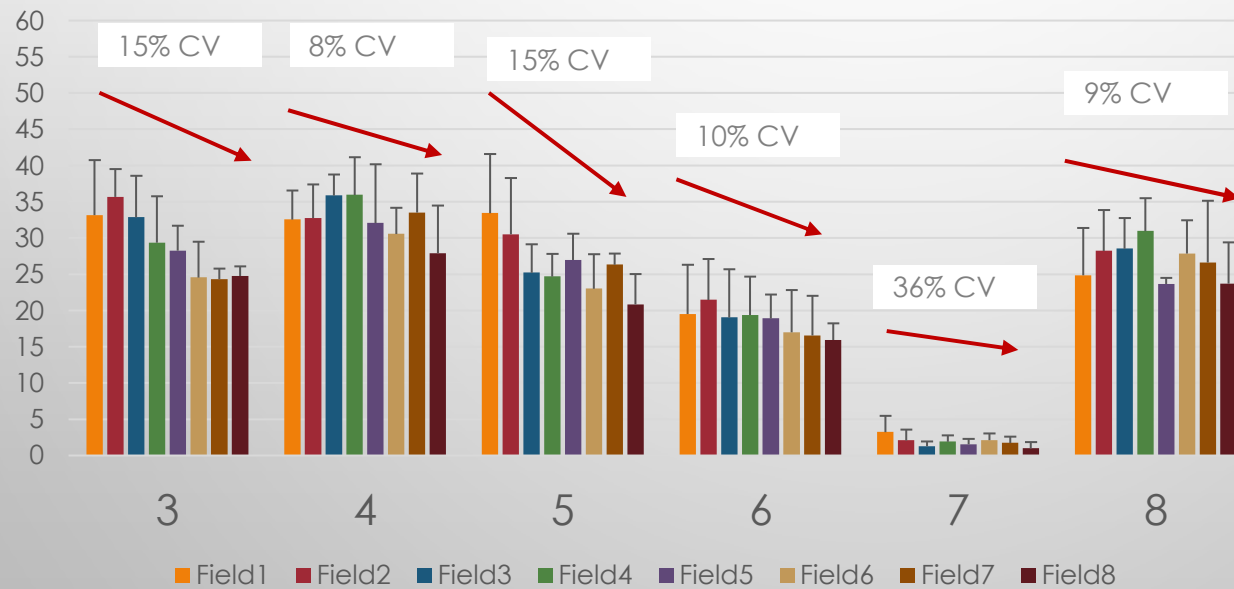
- Highly operator depending
- Not exact volumes used

CASA Systems

- Fast process
- Highly repeatable determination



Total motility per male and per field



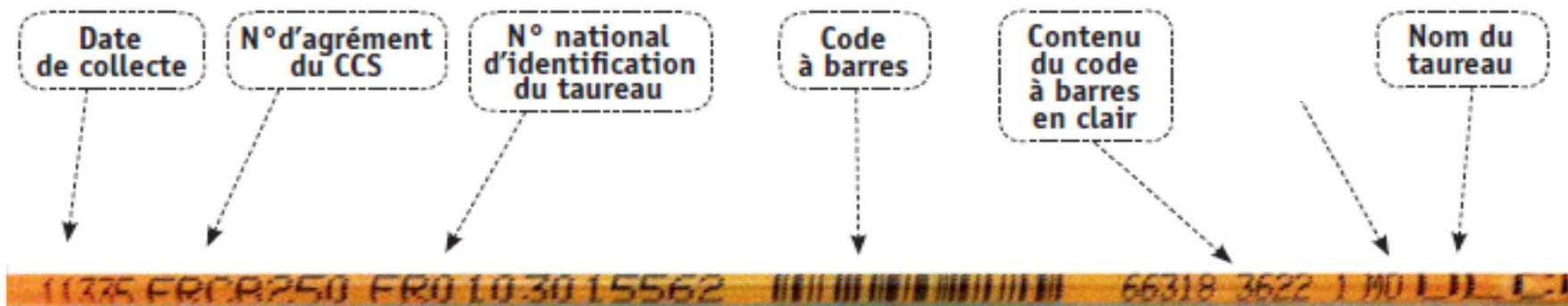
- Variation is higher, motility reduction along the time. (4 replicates x 6 males)
- Using 4 chambers Leja® slide and dilution of ActiFish at 1:9 (20 frames/field)



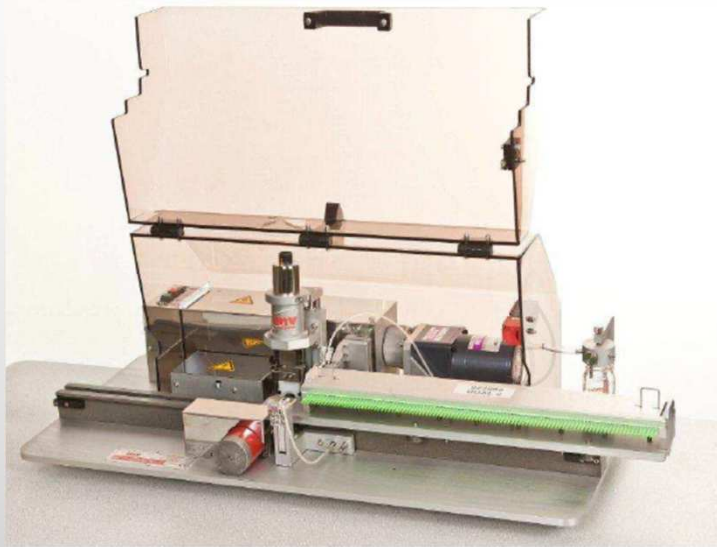
CONTAINERS

Container: **IMV STRAWS**

- Optimized heat exchange from high surface to volume ratio
- High homogeneity on freezing progress inside the straw
- Cryo-resistant plastics
- Printable for traceability
- Non spermicide plastics
- Size & shape allow optimization of the space in storage tanks (LN2 is the most important cost)



FILLING & SEALING



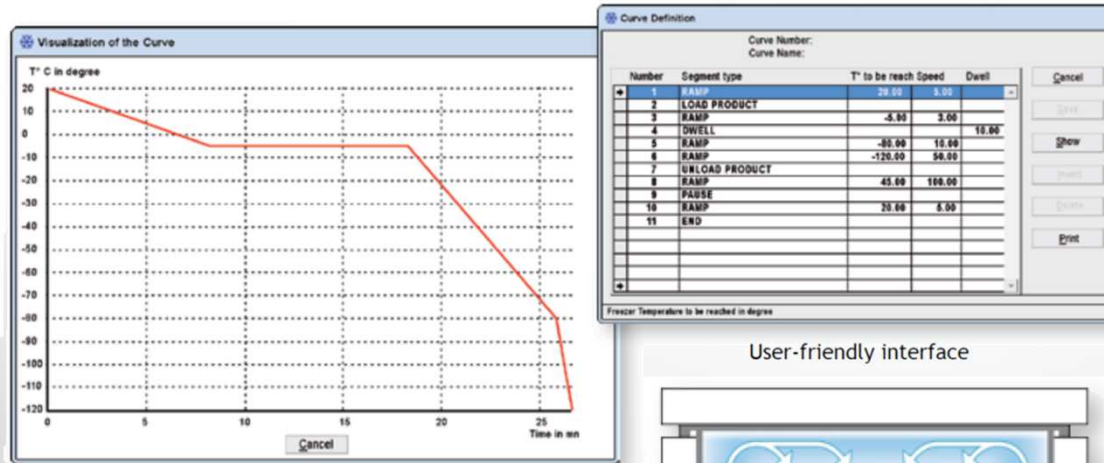
MRS1 DUAL



ISEVO RANGE

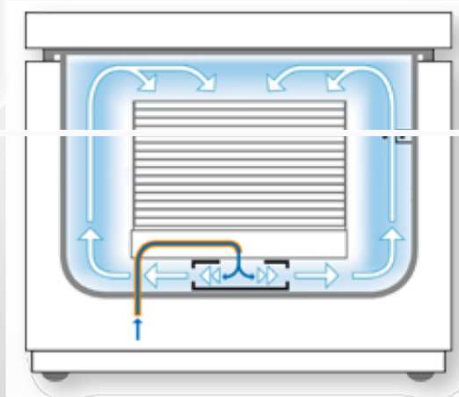
From 1000 to 12.5000 straws filled /hour
Ultrasound sealing (Avoid heat)
Discardable consumables for sanitary purposes
Filling detection system (ISEVO)

AUTOMATED FREEZING



Easy monitoring of temperature curve

User-friendly interface



- 3 000 straws per freezing
- Perfect airtightness and insulation
- Racks easy to stack and remove
- **Easy freezing curve definition parameter**
- Simplicity of operation for the « operator » profile
- **Printing of freezing reports with corresponding curves**

STRAW IDENTIFICATION



Colorful straws for easier identification



Colored visotubes and goblets for easier packaging

STORING



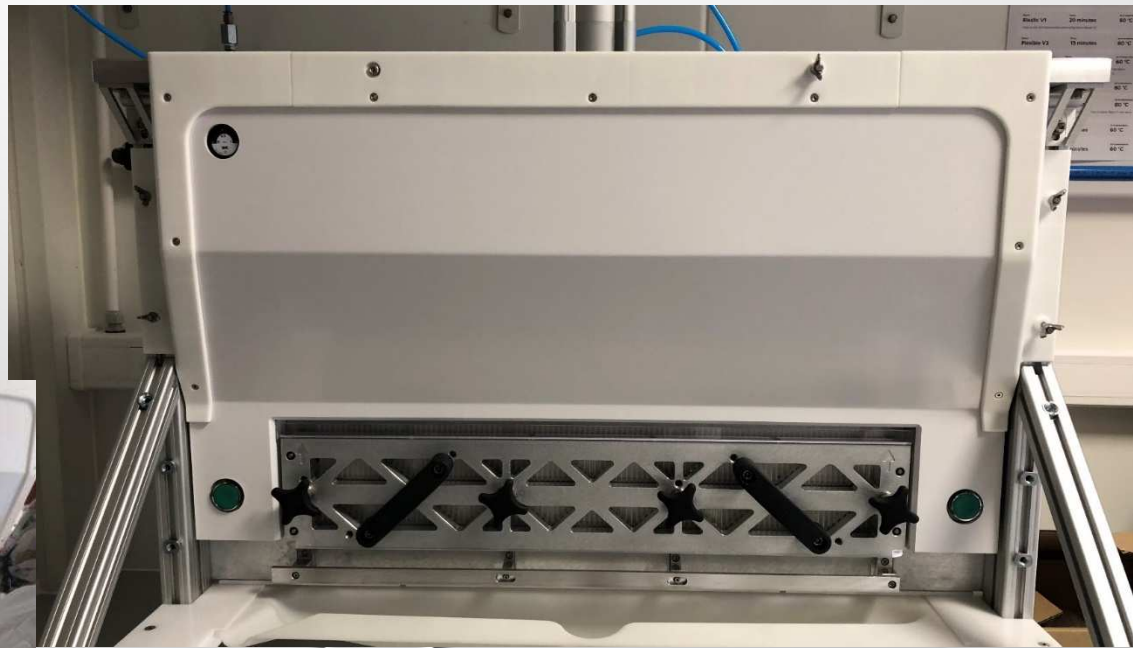
Storage capacity optimized with straws



AUTOMATED STRAW EMPTYING

- EMPTYX

- 100 straws emptied at the time.
- Pneumatic system for pushing plug homogeneously
- Easy to use.





SALMONID EGG SORTING





MORTALITY IS CAUSED BY:

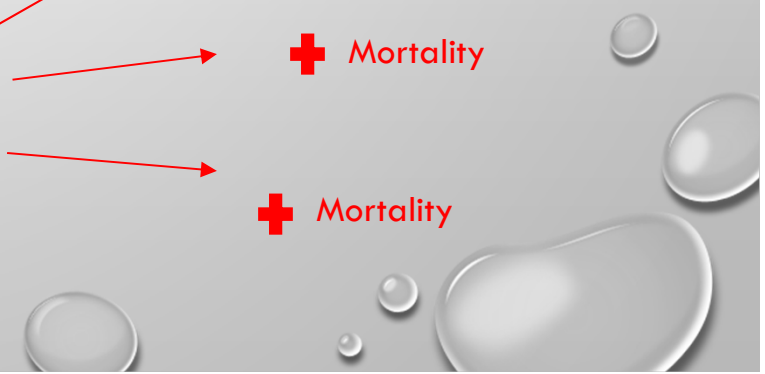
**% UNFERTILIZED EGGS
DAMAGED EGGS
ASPHYXIATION (LACK OF OXYGEN)
WATER POLLUTION
TEMPERATURE SHOCK**



Fungal Infection

+ Mortality
+ Mortality
+ Mortality

+ Mortality
+ Mortality
+ Mortality



A. SALMON INCUBATION



SORTING
↓
SORTING
↓

ATU

0	50	100	150	200	300	350	400	450	500	
Eggs cannot be manipulated				Shocking	Incubation/Transport		Hatching			



Fertilized eggs

- +Egg membrane hardening
- +Cell division
- +Embryo development
- Non-fertilized egg mortality
- Water condition affects the eggs
- Fungal infection

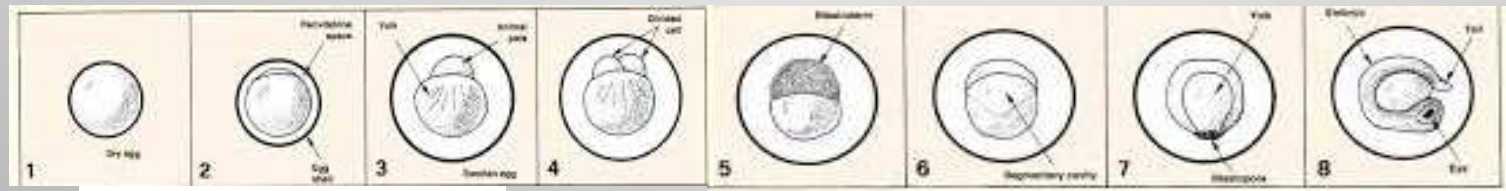


Eyed eggs

- +Embryo growth
- +Eggs becoming more resistant
- + Eggs can be picked
- Non-fertilized egg mortality
- Water condition affects the eggs
- Fungal infection


















Hatching



ELIMINATION CHART



Type of problem		Description		
Dead		Eggs dead for any reason, turning white or opaque after globulin precipitation. Susceptible to FUNGAL INFECTION		
Glass		Empty egg. Embryo is not developed inside and will die. Shocking process is very useful to eliminate this type of egg		
Pin-eyed		Embryo has developed to a certain size and stopped. It will survive a longer time and needs to be eliminated before dispatch		
Pale		Pale eggs are normally related to pin-eyed or considered a weaker egg due to lower amounts of fat/pigment content.		
Hemorrhagic		Hemorrhage can be caused by stressful events like sorting or handling at low ATU or big temperature changes. If the hemorrhage is small, eggs can survive		
White spot		Similar to hemorrhagic eggs, white spots are globulin precipitation after damage by contact or shocking. Survival will depend on the size of the white spot.		
Small		Eggs of lower size or high dispersion will make the first feeding more difficult, due to the difference in vitellin content in the sack		

SORTER SPECIFICATIONS



	QUICKSORTER	PROSORTER
NOMINAL SPEED	1,000,000 eggs/hour	120,000 eggs/hour
ANALYSIS SYSTEM	OPTIC	IMAGE ANALYSIS
SPECIES TESTED	A.Salmon; R.Trout, Coho Salmon, Chinook salmon	A.Salmon; R.Trout, Coho Salmon
COUNTING	YES	YES
TYPE OF SORTING	<ul style="list-style-type: none"> • Dead eggs 	<ul style="list-style-type: none"> • Dead eggs • Pin-eyed • Glass/unfertilized eggs • Pale eggs • Small eggs • Hemorrhagic eggs • Black-spotted eggs
Error	<1 % error in dead eggs <0.5% error in counting	<0.5% error in good eggs <0.4% error in counting



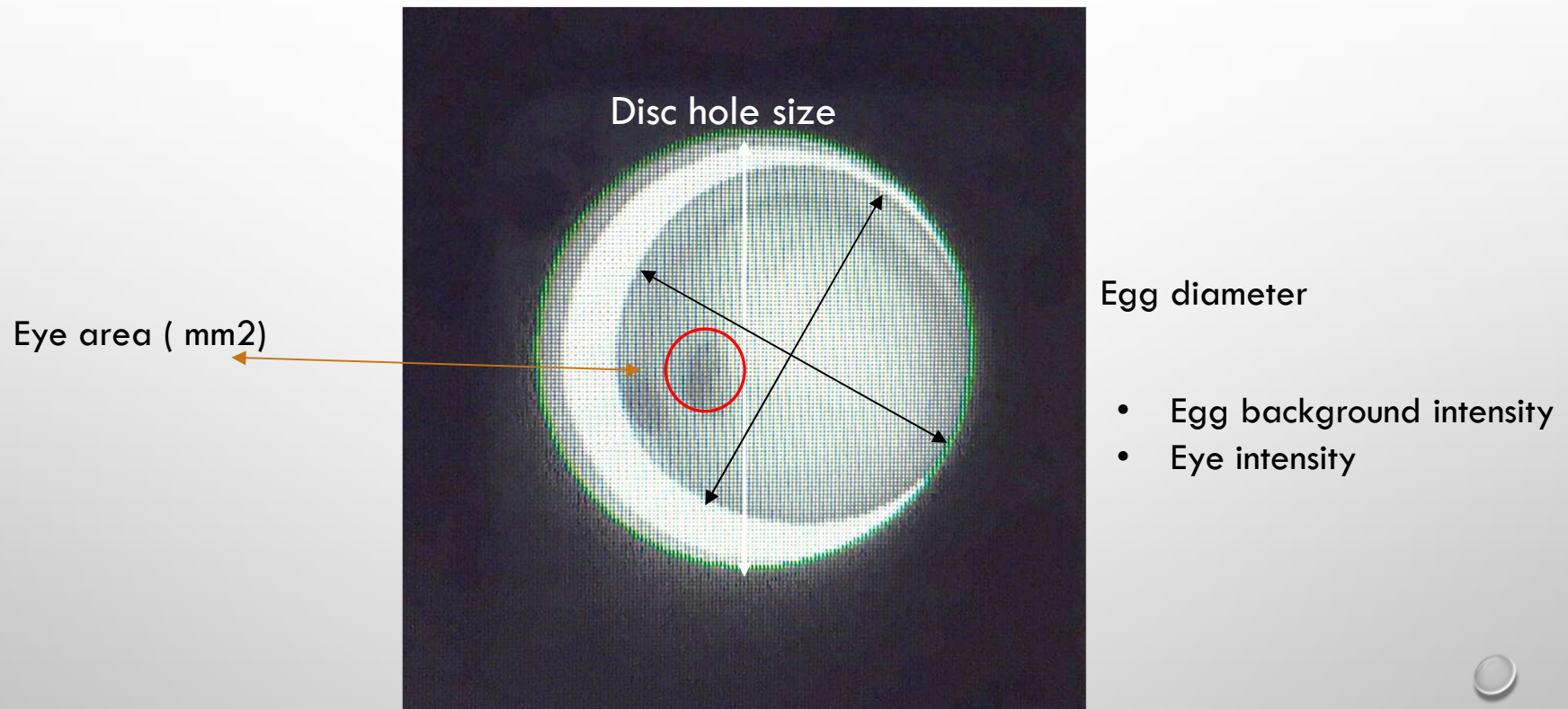
PROSORTER



PROSORTER



SOFTWARE ANALYSIS



Egg diameter

- Egg background intensity
- Eye intensity

Light is projected, allowing the camera to read a “shadow” of the spheric egg



MAIN SCREEN DISPLAY

Batch identification

Batch average (teach-in)

Statistics

Alarm display

Color code description

Barcode results by camera

Camera images

Electro valve control

Tuning parameters

The screenshot displays a software interface with the following components:

- Batch settings:** Includes fields for Operator, Batch ID, Fish Type, and Degree days / ATU.
- Info:** Shows parameters like Ø-hole (7.2 mm), Ø-Egg (5.91 mm), and A-Eye (0.45 mm²).
- Fertilized Egg Count:** Displays Batch: 0 and Split: 0.
- Statistics:** A table with columns for Batch, Split, and Latest.
- Alarm display:** Shows 'Alarm - None' in the top right corner.
- Barcode results by camera:** A grid of colored bars representing data from cameras A, B, C, and D.
- Color code description:** A legend on the right side of the grid defining colors for Fertilized, Small, Glass, Invertebrate, Dead, Unfertilized, Embryo, Not a small larva, Bad, and Error.
- Camera images:** Four circular images labeled Image A, Image B, Image C, and Image D.
- Electro valve control:** A section with 'Valve' controls including Filtrate (100.0%), Regulation value (0%), and Manual regulation (0.00).
- Tuning parameters:** A section with 'Parameter Tuning' including Valve Offset (1), Valve Z-Point (36), Threshold Dead (79.00), Area Dead (0.29), Cleanliness Factor (1.00), Egg min-size (30.00), Egg max-size (200.00), and Eye min-size (50.00).
- Trio Monitor:** Shows Trio State (100) and RPM (0).

Advantages of PROSORTER



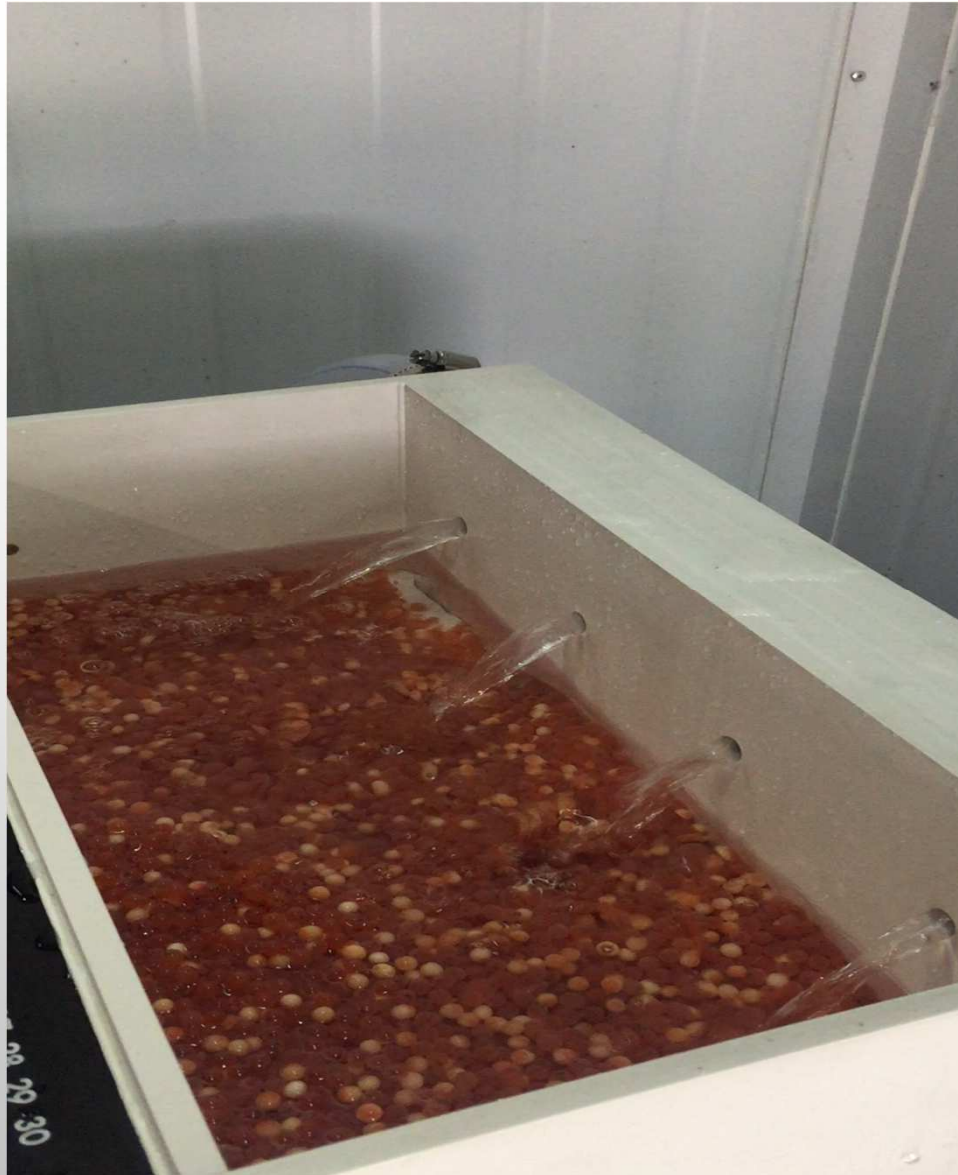
CHARACTERISTICS	BENEFIT
120,000 eggs/hour effective. almost 1 million eggs/day!!	Reduction in working hours
	Sorting can start at higher ATU with better results*
Gentle handling of good eggs	Lower mortality post sorting
High accuracy on egg sorting (<1% error)	Customer claim reduction! (Hand picking results in 2-7% error)
High accuracy on egg counting (<0.5% error)	Sorting eggs ready to pack
Batch to batch calibration	Higher accuracy on variable groups of eggs
Reports by batch	Reports with counting, size and eye size information.
Egg size sorting (fine tuning parameters)	Obtain two populations of good eggs split by size



QUICKSORTER



QUICKSORTER



Advantages of QUICKSORTER



CHARACTERISTIC	BENEFIT
High Speed Drum system	1.000.000 eggs sorted /hour !!!
	Less working hours/day
Gentle handling of good eggs	Lower mortality post sorting
High accuracy on egg counting (<1%)	Fast counting since shocking . Accurate number of eggs!
Highly accuracy on Dead egg elimination (<1%)	Ideal for picking after shocking
NEW Conic holes drum allow high egg size variation.	Batch with higher dispersion can be sorted without changing drums.

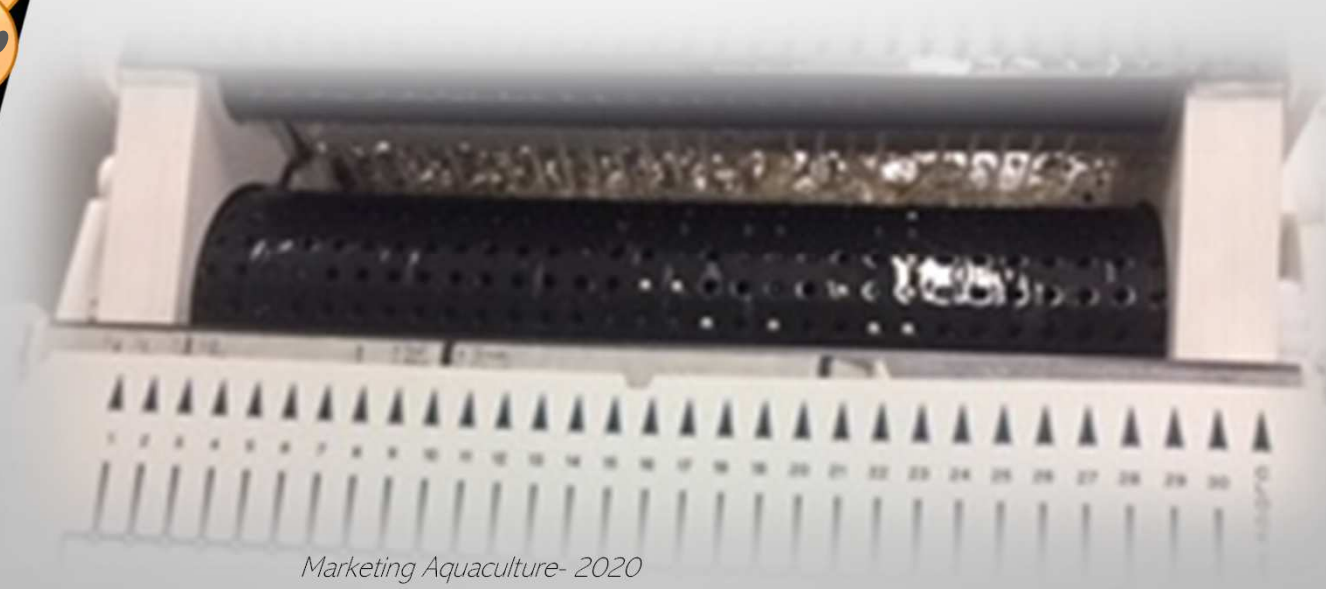
QUICKSORTER- CONIC DRUM



NEW



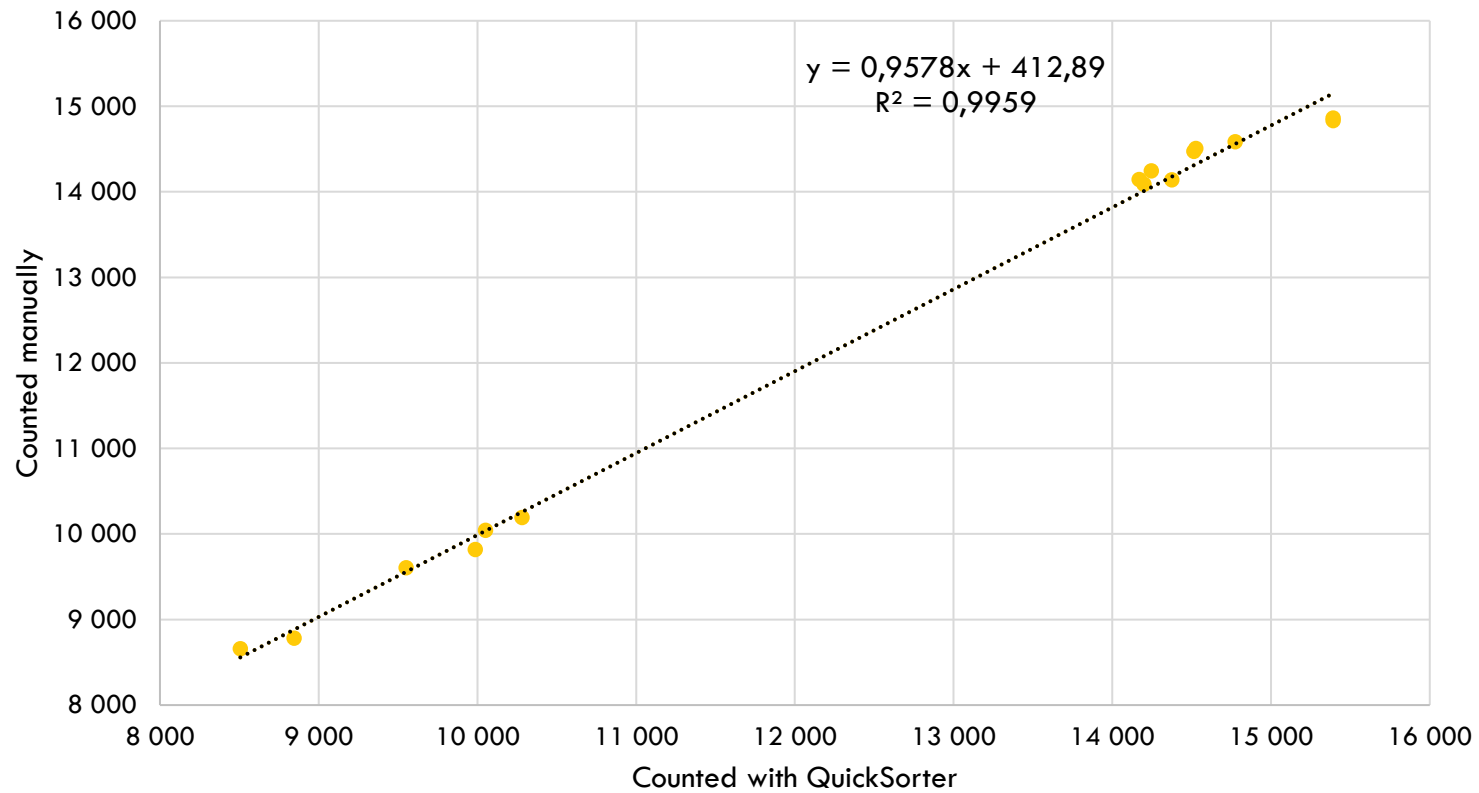
- Conic holes allow sorting of higher range of egg size (specially useful on early sortings)
- All eggs, even with high dispersion.
- 2 drum hole size for large and small range of eggs.
- Other optical sensor machines allow small size dispersion.



QUICKSORTER COUNTING ACCURACY- 2018



Counting Accuracy QuickSorter



Based on 18 batches counted

