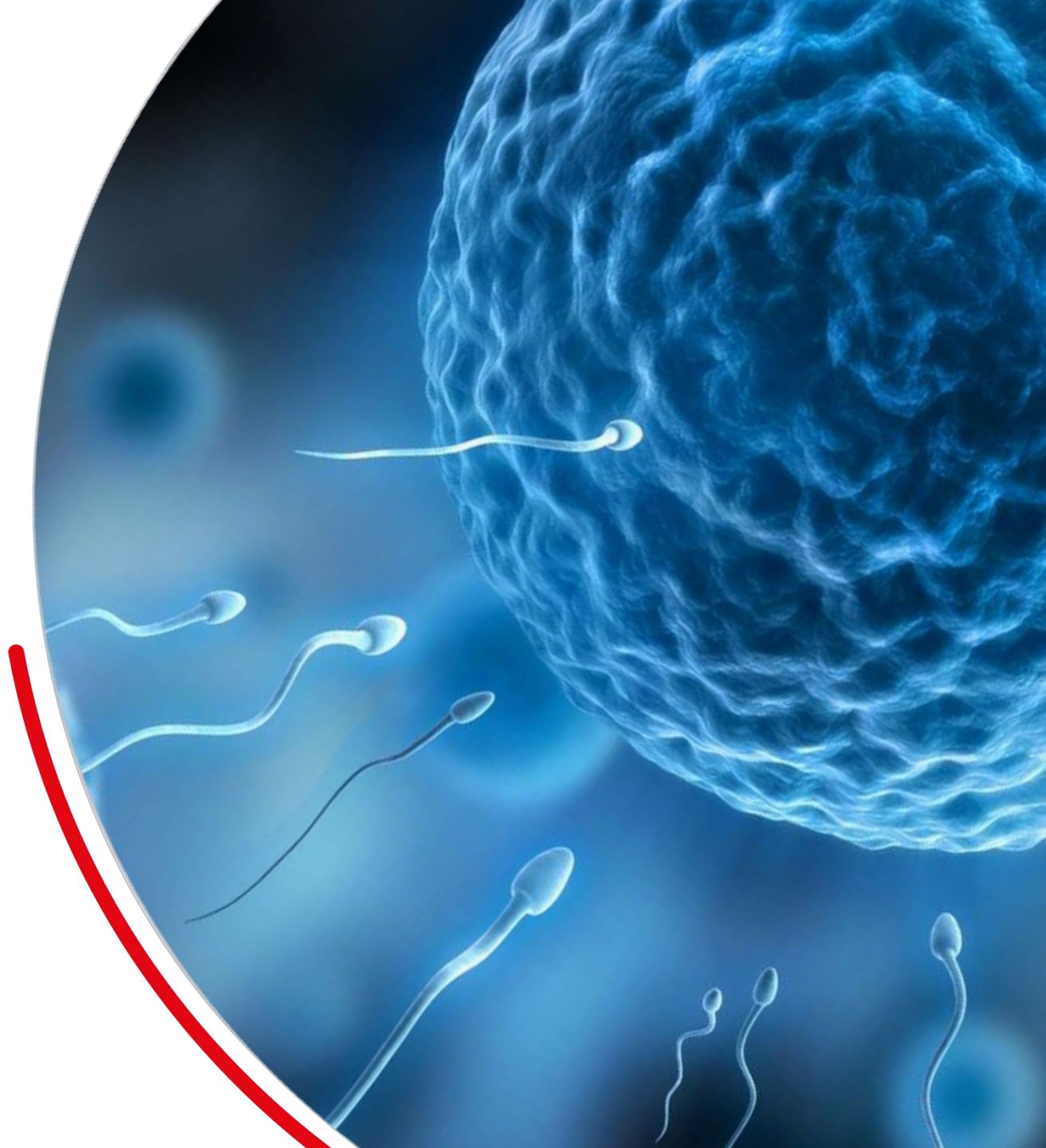




卡苏公司新产品介绍



Marshall Ma
Marketing Manager IMV China



摘要

1- FLOW CYTOMETER—EasiCyte

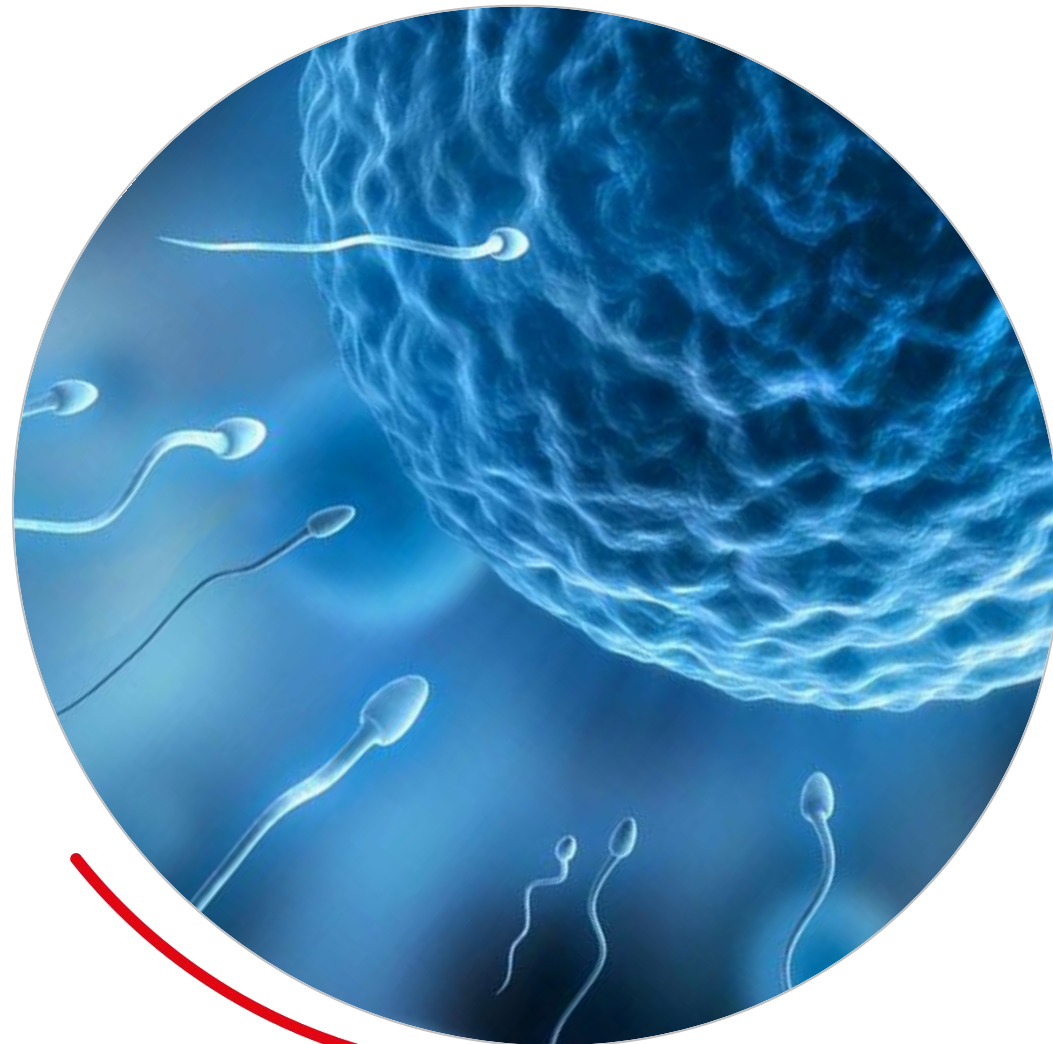
流式细胞仪—EasiCyte

2- Backup boar fertility prediction software—Ecotext

后备公猪生育力预测软件—Ecotext

3- Intermuscular fat measurement software—Biosoft

肌间脂肪测量软件—Biosoft



为什么做精液分

析？

精液质量好=生育力高？



精液生产？

精液质量控制？

科研？



**Good
Sperm Quality**
精液质量好

**High
Field Fertility**
生育力高

为什么做精液分

析？

Fertility 繁殖力

是一个多因素的过程：依靠精液质量，雌性生育能力，适当的动物饲管理，准确的AI（人工授精）时间.....

- 精液质量不相同（健康，年龄，环境，收集方式，分析方法等）。
雌性生育力通常包含在育种目标中。
雄性的生育力无法评估，应通过定期检查繁殖和评估精液质量来监测。



定期评估精液质量是预测雄性繁殖能力的有效办法

精液分析 - 分析什么？

pH 颜色 气味 精液量

渗透压 浓度 一致性

计数 密度

形态

活力

运动性 (VSL、VCL、VAP 等)

前向运动

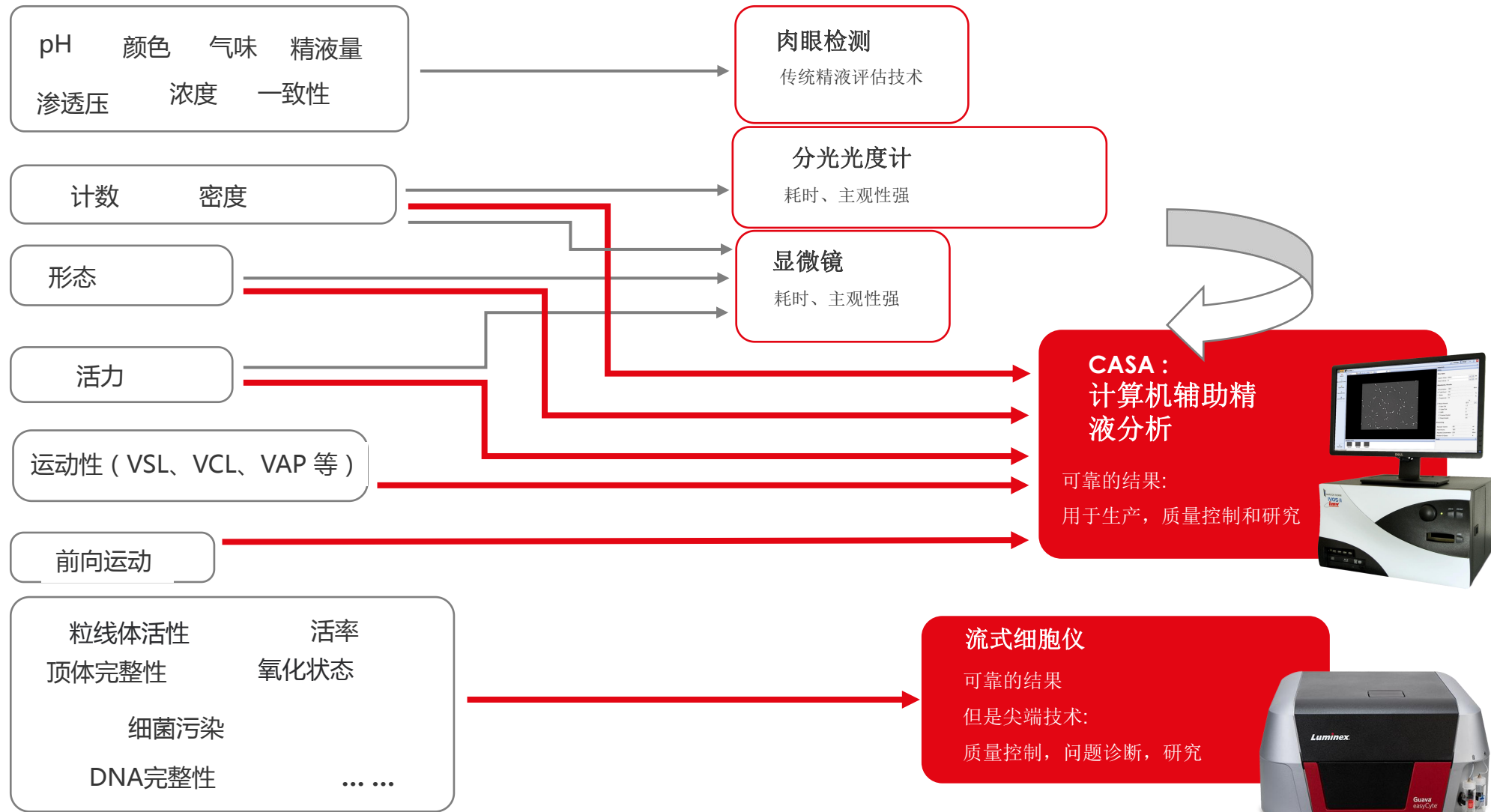
粒线体活性 活率
顶体完整性 氧化状态

细菌污染

DNA完整性

精液分析有哪些参

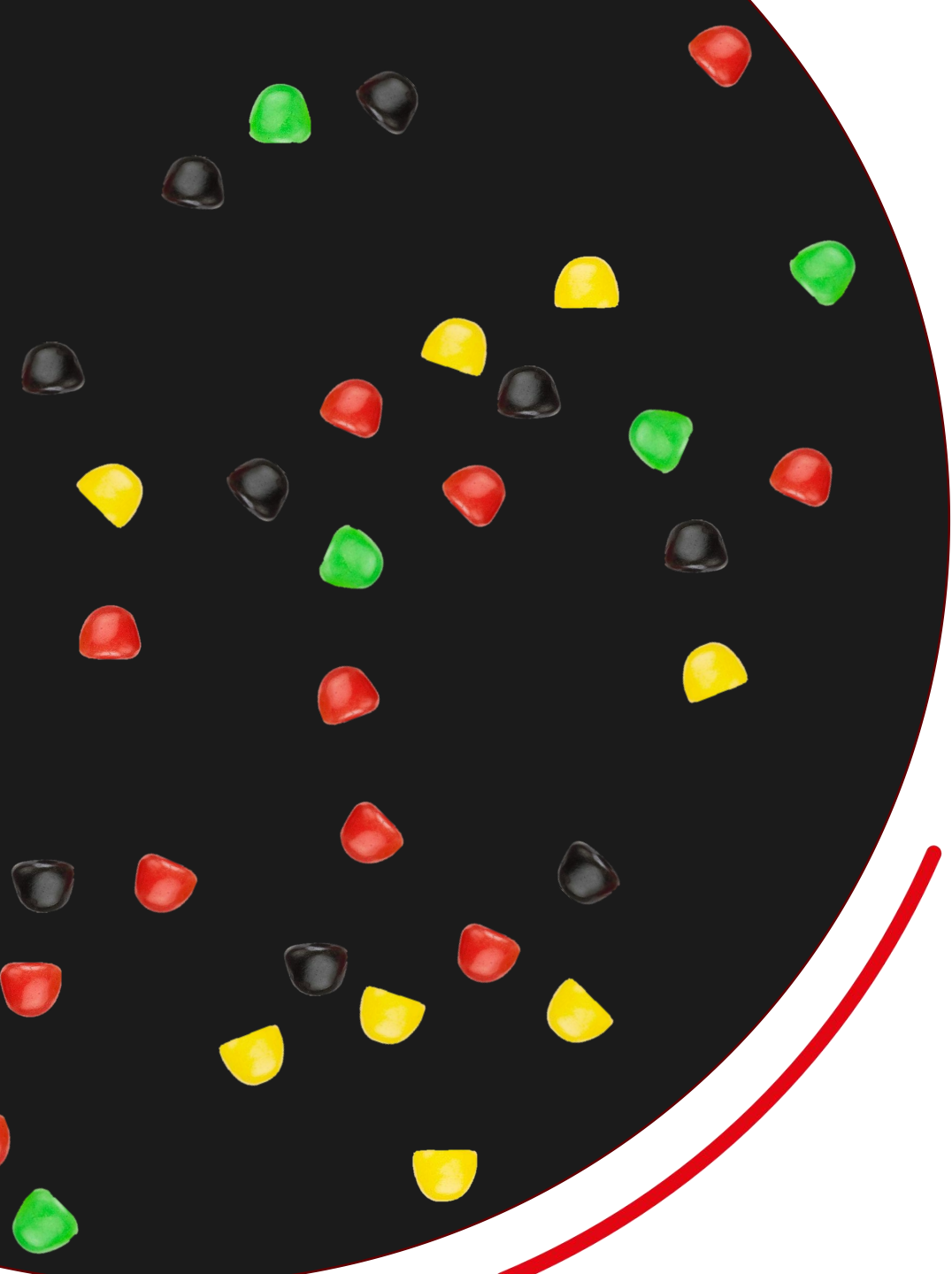
数?





I want only
“round strawberry flavored
candy”!
我只想要“圆的草莓味的糖
果”!

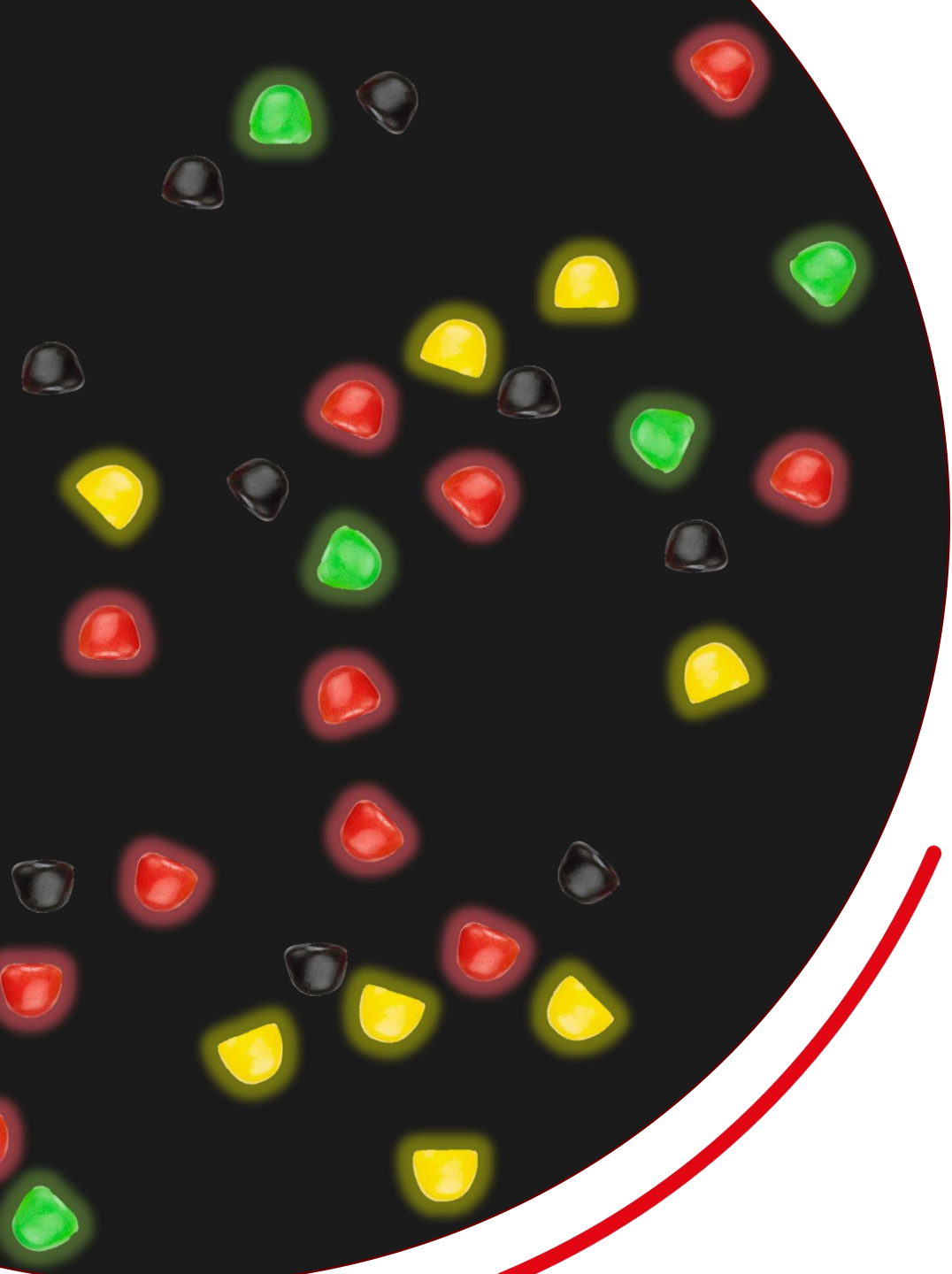
如何区分?



I want only
“round strawberry
flavored candy”!
我只想要“圆的草莓味的糖果”!

如何区分?

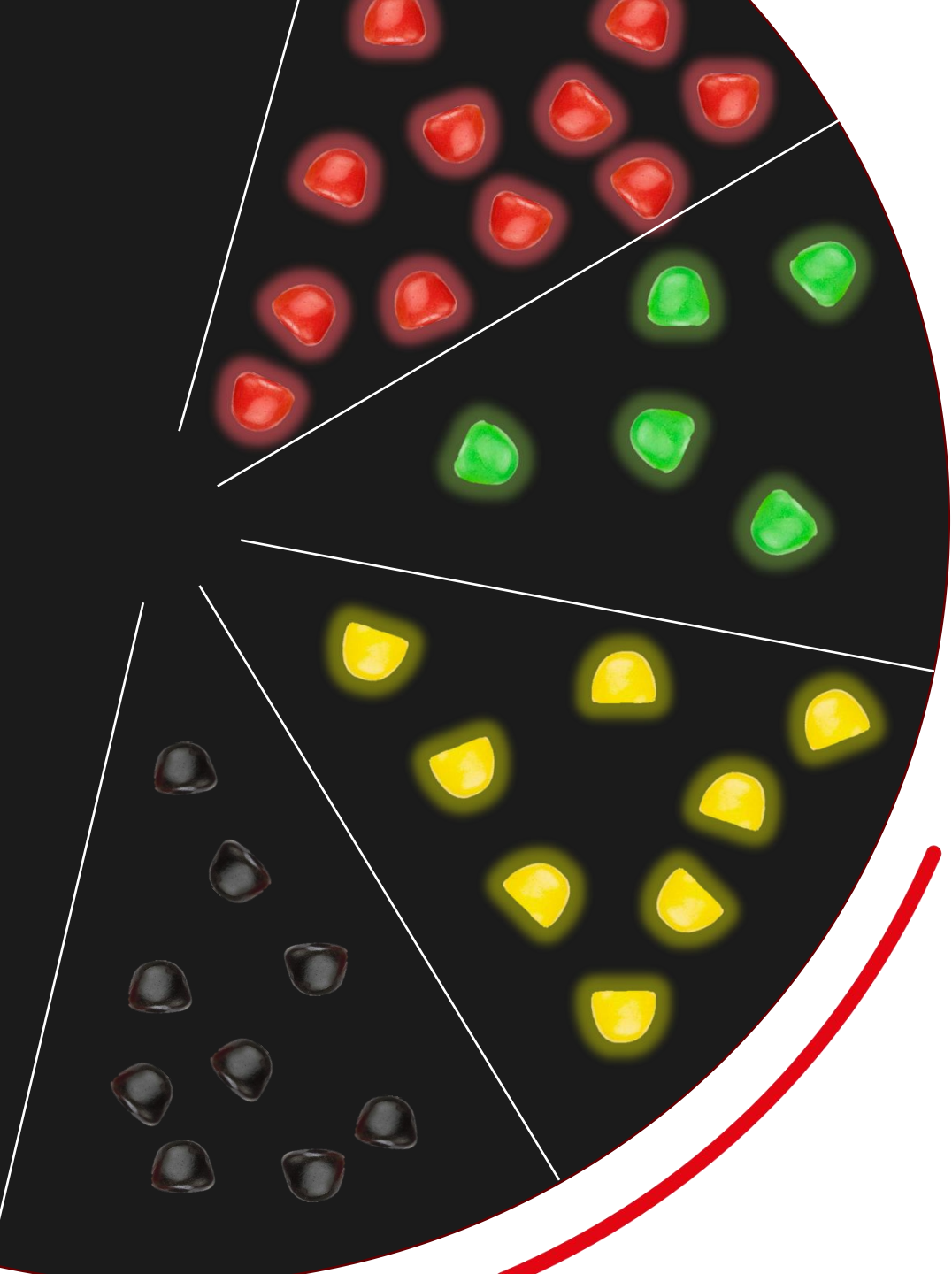
1-形状选择



I want only
“round strawberry flavored
candy”!
我只想要“圆的草莓味的糖果”!

如何区分?

- 1-形状选择
- 2-标记-风味=>着色

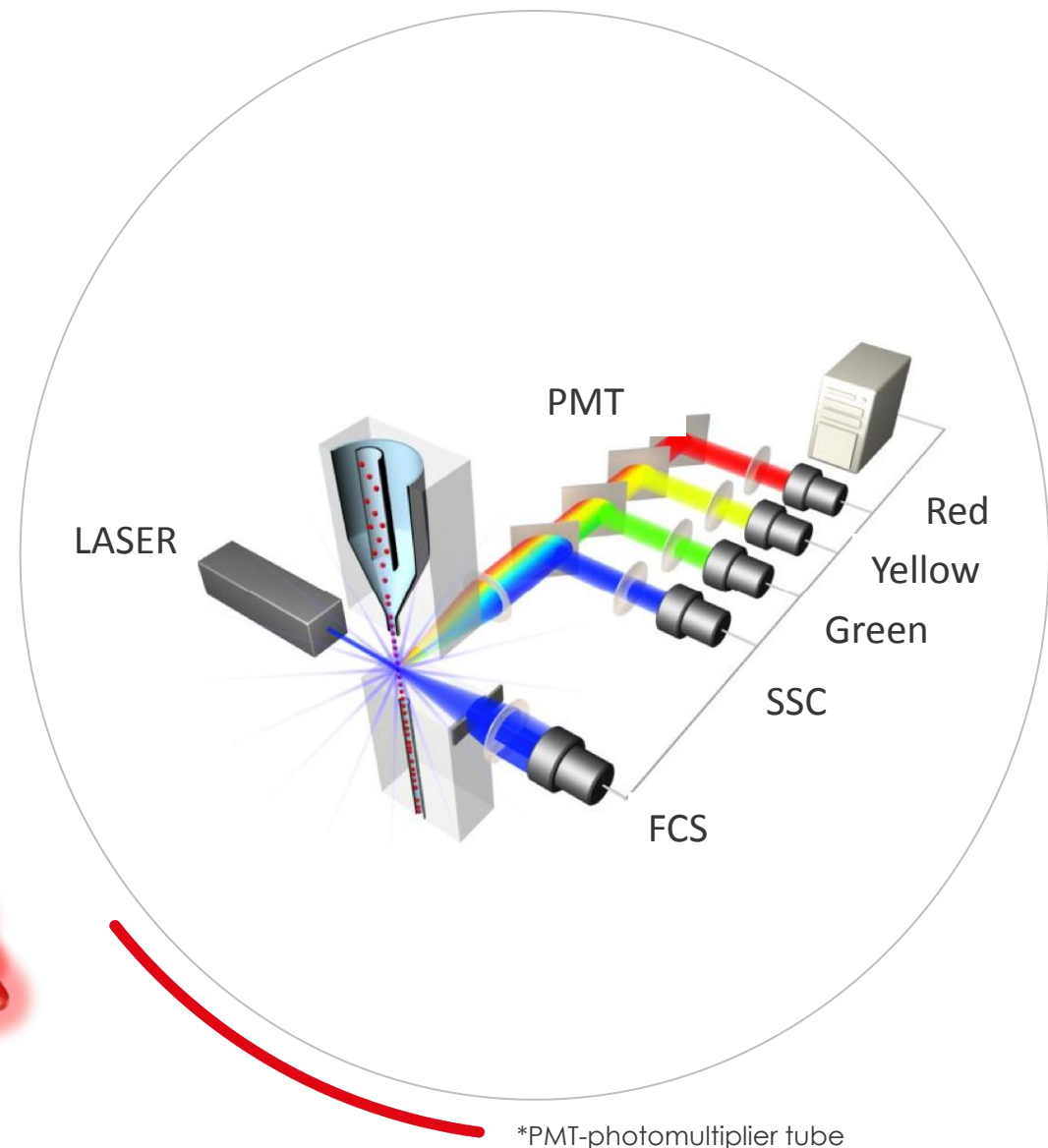


I want only
“round strawberry flavored
candy”!
我只想要“圆的草莓味的糖果”!

如何区分?

- 1-形状选择
- 2-标记-风味=>着色
- 3-颜色区分

流式细胞仪-如何工作



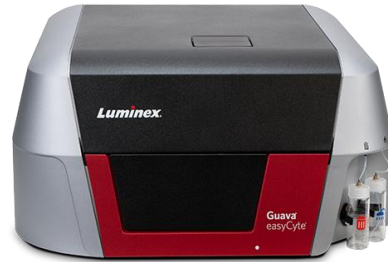
来自 卡苏得强有力支持

为您的实验室提供一站式解决方案

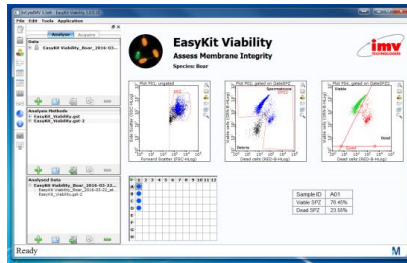
- 细胞仪系列

96 孔板或管模型

+ 更多激光型号



- 专用精液分析软件
- 现成即用模板



IMV Guava® InCyte™



- 精液分析技术支持



- 即用得脱水染料套装

EasyKits®



EasyClean®



EK1 Viability 活率



EK1 Concentration 密度



EK2 Mitochondrial activity 线粒体活性



EK3 Oxidation 氧化



EK5 Viability & Acrosome integrity 活率和顶体完整性

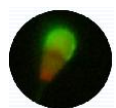


EK6 Bacterial concentration 细菌浓度

样品准备流程



精液质量评估



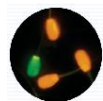
活率 & 顶体完整性

- 活死精子百分比：细胞膜状态
- 顶体完成性百分比：顶体膜状态



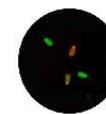
密度

精子细胞总数

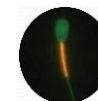


活率

- 精子膜完整性指标
- 活精子和死精子的区别

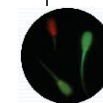


DNA完整性



线粒体活性

- 极化线粒体（橙色）；
- 去极化线粒体（绿色）



氧化水平

- 检测精子中的自由基

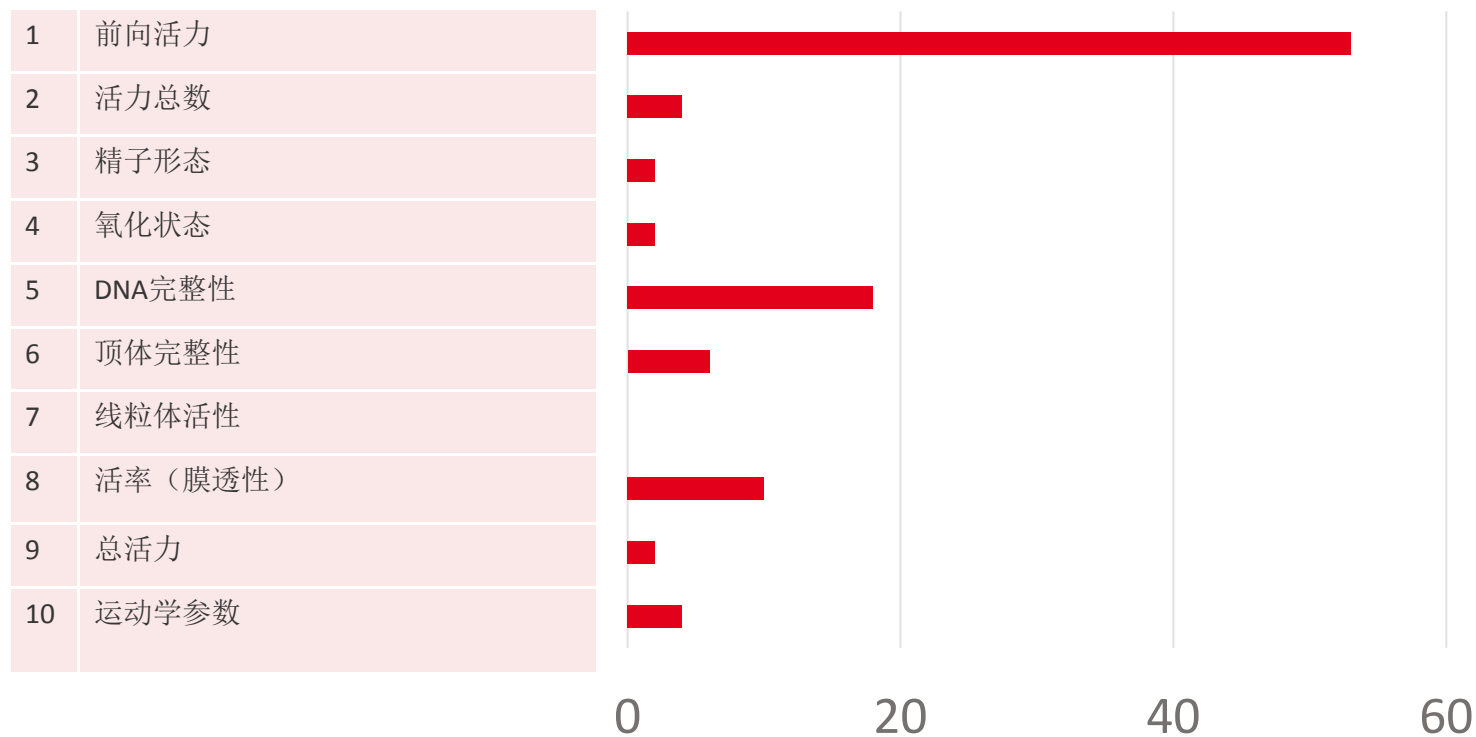


细菌浓度

精液分析:提高生育能力的新视角

精液密度达到最佳的前提下，以下这些变量为预测精液生育力的最佳指标

(ICAR Congress, France, 2016)



精液分析:提高生育能力的新视角

Bovine牛: $R^2= 0.84$

with high green fluorescence representative of immature cells). A significant relationship ($R^2 = 0.84, P < 0.05$) was observed between real and predicted fertility. Once the accuracy of fertility prediction has been confirmed, the model developed in the present study could be used by artificial insemination centers for bull selection or for elimination of poor fertility ejaculates.

(Glozzi T.M. et al Animal. 2017)

两个变量
运动学
DNA完整性

Equine马: $R^2= 0.942$

In conclusion, the results of the present experiment has enabled the determination of a new protocol for the evaluation of stallion semen, combining microscopical observation, computer-assisted motility analysis and flow cytometry, and providing a high level of fertility prediction. Similar investigations are in progress on frozen semen.

(Barrier B. et al. Theriogenology. 2016)

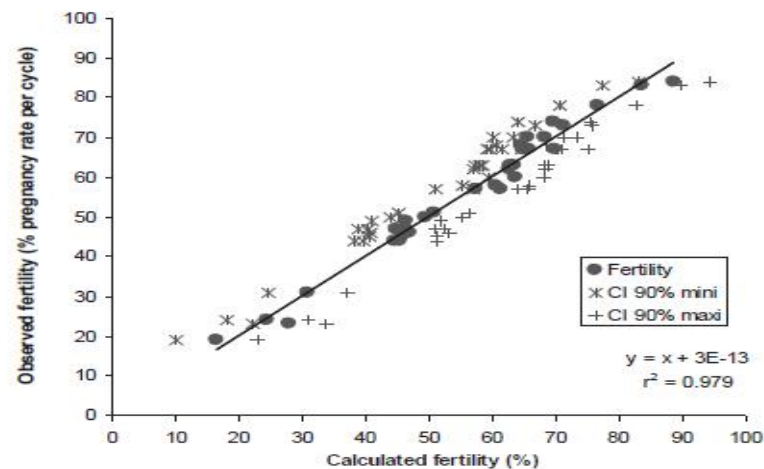


Fig. 3. Relation between the observed field fertility value (“observed fertility”) and the predicted fertility value based on the linear regression model (“calculated fertility”). For each stallion ($n = 33$), the observed fertility is presented as a function of the calculated fertility, as well as the minimal and maximal values of the 90% confidence interval (“CI 90% mini” and “CI 90% maxi”). The equation of the regression curve between the observed fertility and the calculated fertility is presented with its r^2 . The adjusted r^2 of the linear regression model that was used to calculate the fertility was 0.942.

20个变量
运动学、活力、顶体、
氧化、DNA.....

总结

**精液分析：
提高生育能力的新视角**

流式细胞仪方法:

- 充分评价精液质量;保证和提高精液质量。
- 诊断问题;优化精液处理
- 预测雄性生育能力;动物选择

精液分析可通过CASA和流式细胞仪(EasyCyte, EasyKit, 软件, 协议)进行**标准化**。

结合各种精液分析结果, 提高了**场内生育力的预测**。



技术支持团

队

- 技术支持团队



- 不同的培训类型

安装、培训、服务跟进，远程支持，研究项目支持...

优势

- 超30年精液分析的实践经验
- 超20年的兽医实践经验
- 超10年的流式细胞仪的实践经验

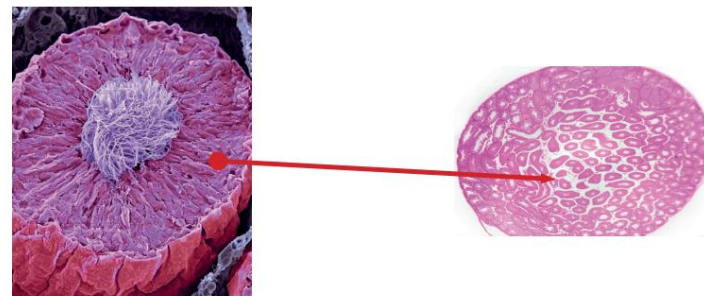


后备公猪生育力预测软件—**Ecotext**

ECOTEXT是一款通过研究公畜
睾丸组织的超声（B超）视频，
从而监测、了解和测量睾丸实
质部位生理或病理变化，以评
估预测分析该公畜的精液质量
和生育能力的软件。

Ecotext | 全新的超声软件

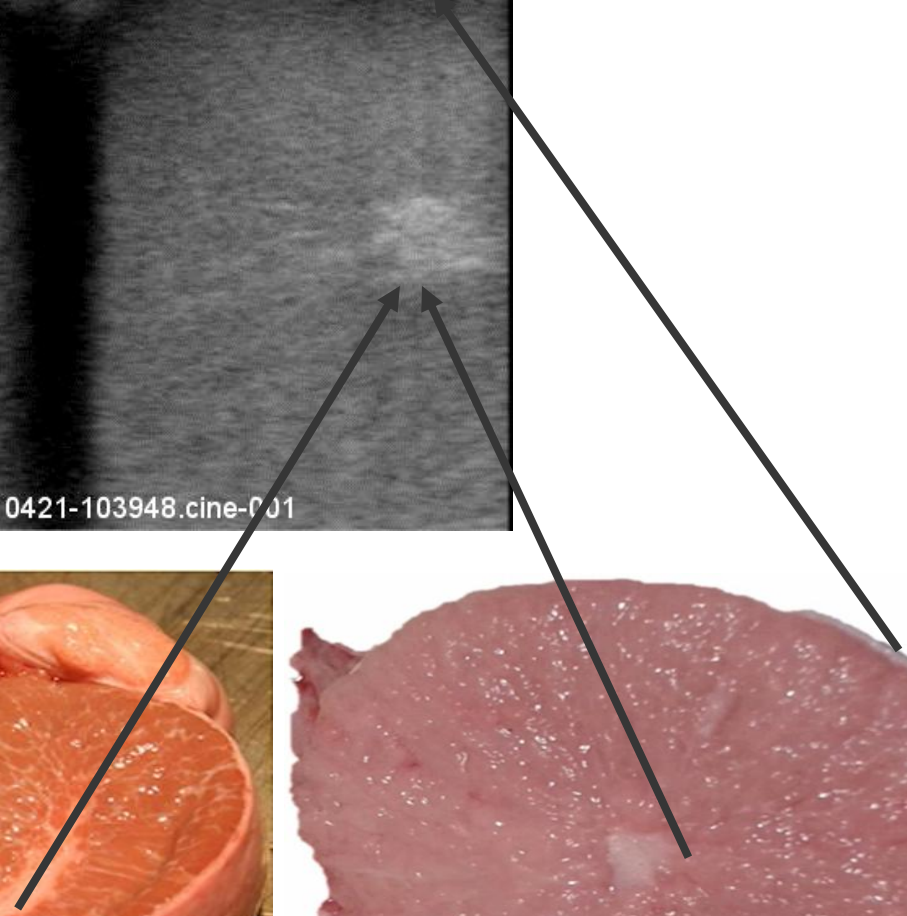
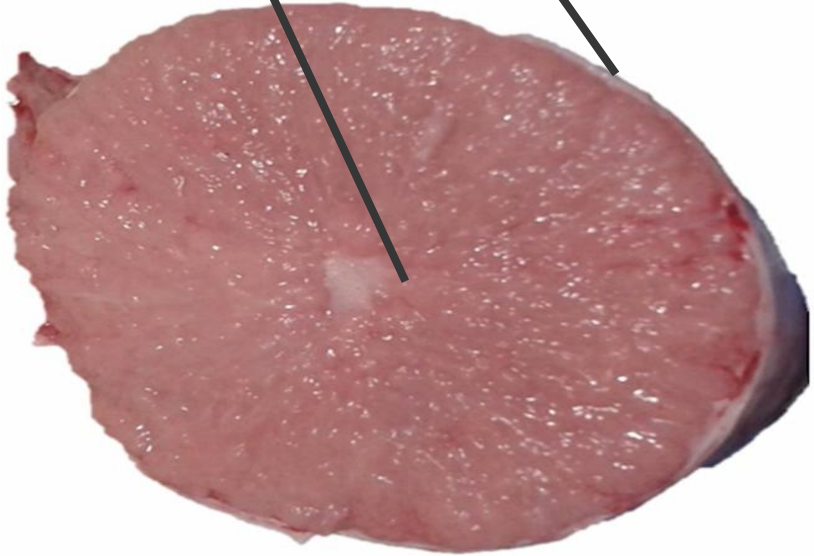
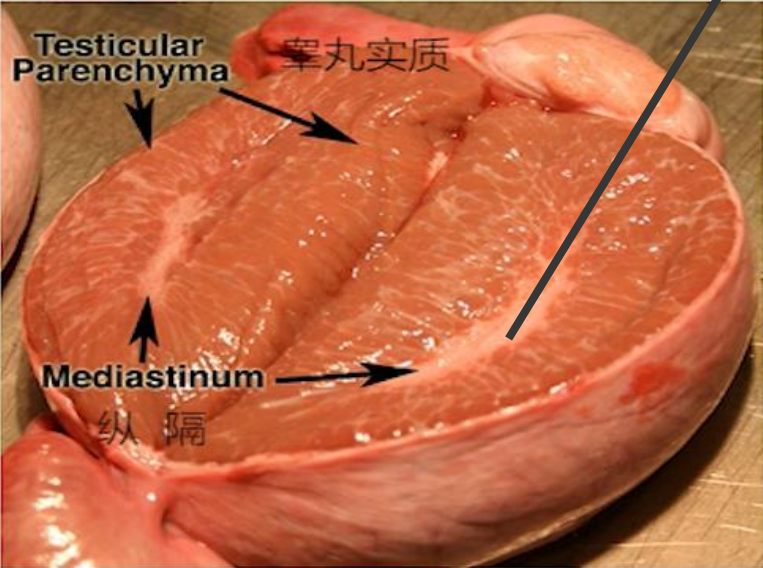
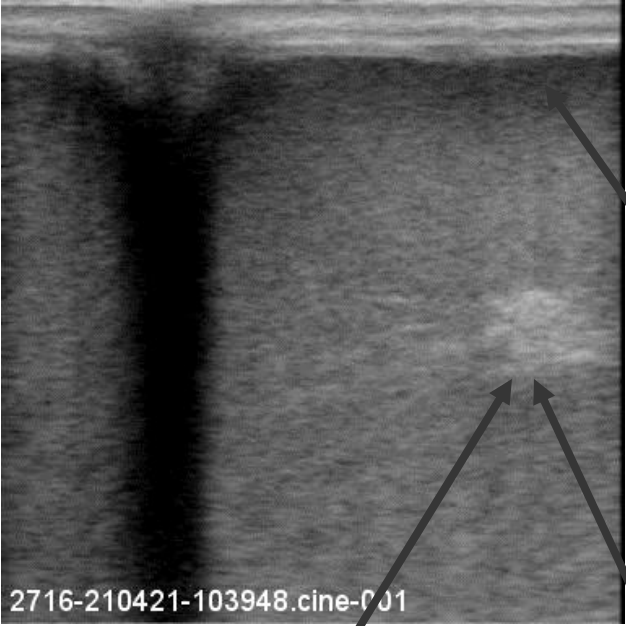
宏观/微观评估青年公畜(猪、牛、马、羊)睾丸发育
及时找出低生育力和不育的公畜，降低生产成本



唯一一款能够探测曲细精管的超声软件



ECOTEXT软件工作原理



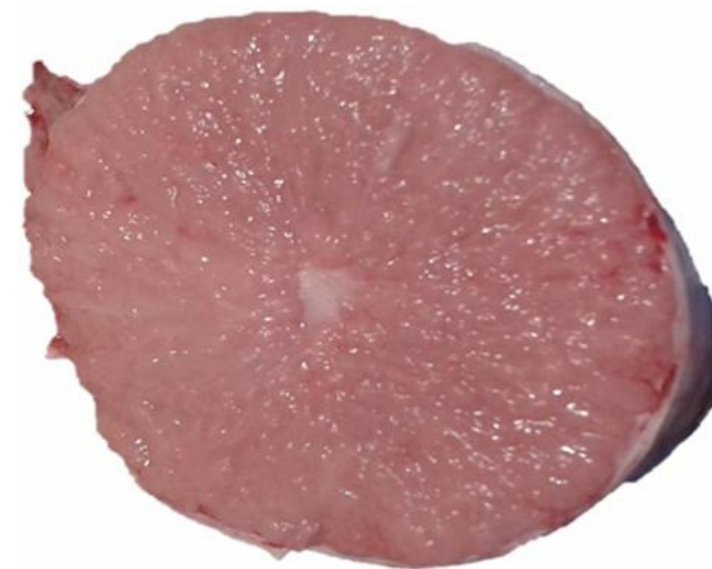
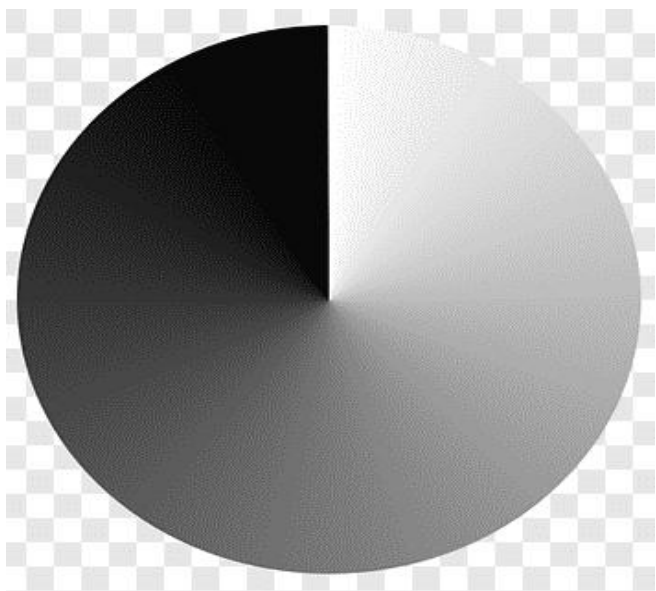
ECOTEXT软件工作原理

宏观结构 (3个指标) :

- EcoText 1 - 黑色像素 (液体, 空腔)
- EcoText 2 - 白色像素 (钙化)
- EcoText 3 - 灰色像素 (软组织)

微观结构 (3个指标) :

- %HA面积 - %精细管
- 直径HA = 小管相关的低回声区域。
- HA密度 - 以 cm^2 为单位



ECOTEXT软件工作原理

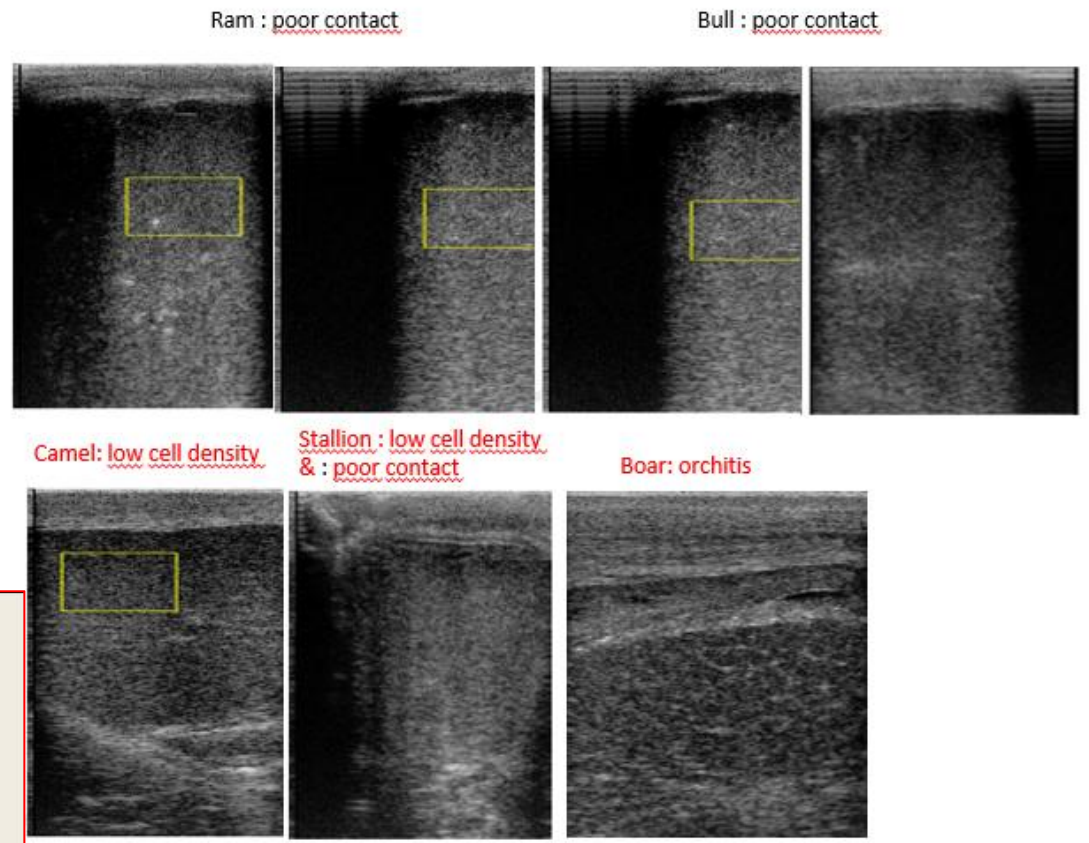
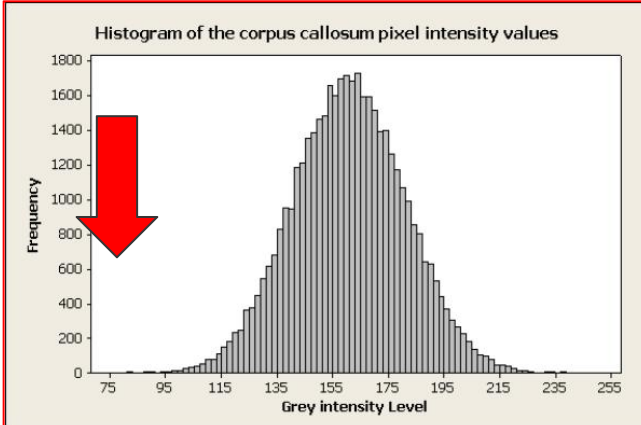
直方图参数:Ecotext 1或Test 1

对应于灰度值为0或接近0的像素个数，即睾丸实质超声图像中最黑的像素部分。

Ecotext 1表示:

- (1) 液体的存在
 - 正常:小管见睾丸液(值1 ~ 10)
 - 病理:血肿、水肿等(值>10)
- (2) 也可能提示细胞密度过低(值>10)
- (3) 超声探头接触不良(值>10)

临界值 (所有物种) : 1-10



ECOTEXT软件工作原理

直方图参数:Ecotext 2或Test 2

对应于灰度值为255或接近255的像素个数，即睾丸实质超声图像中最白的像素部分。

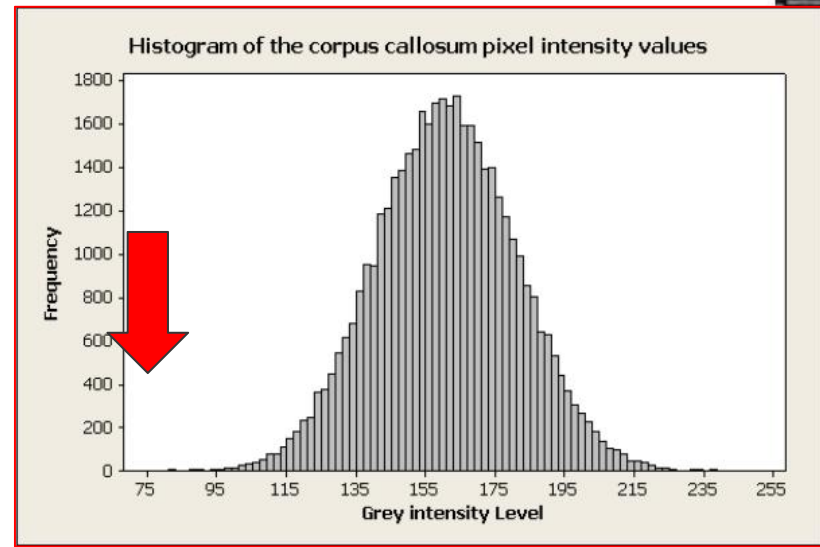
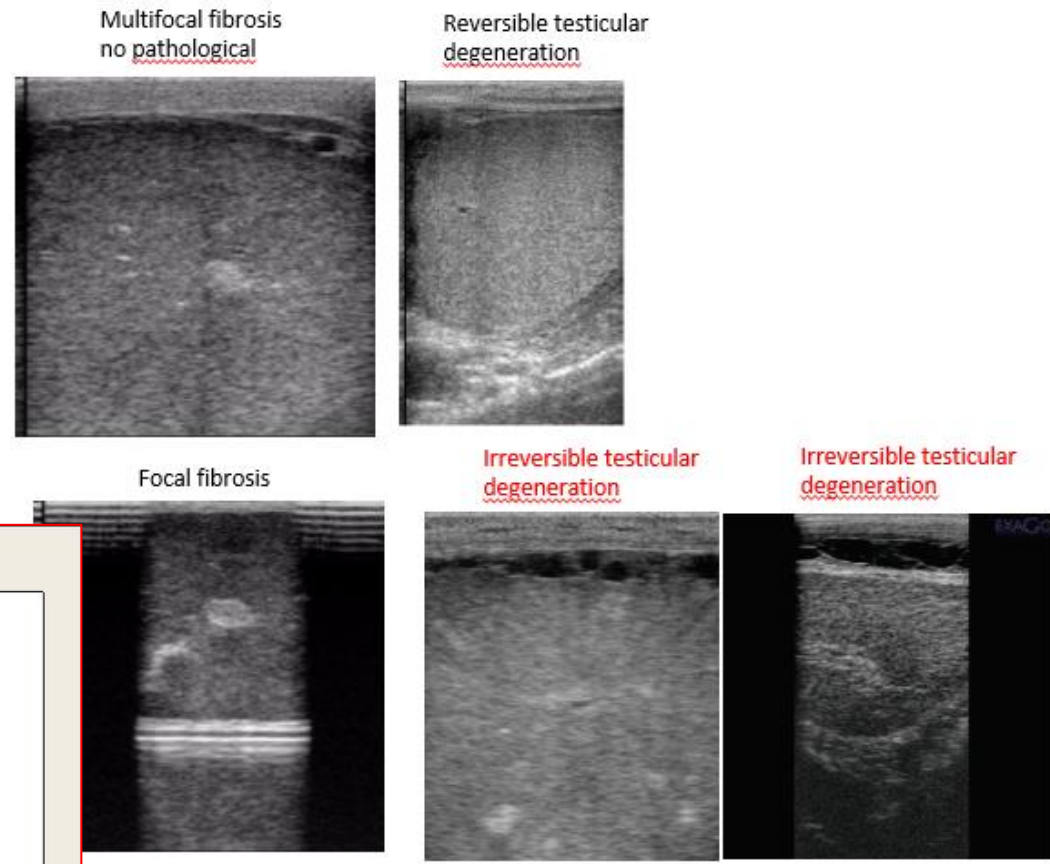
Ec2表示(从低值到高值)

(1)缺乏液体(曲细精管可见睾丸液体)和/或缺乏发育良好的曲细精管

(2)纤维化病灶

(3)钙化的存在

临界值（所有物种）：1-10



ECOTEXT软件工作原理

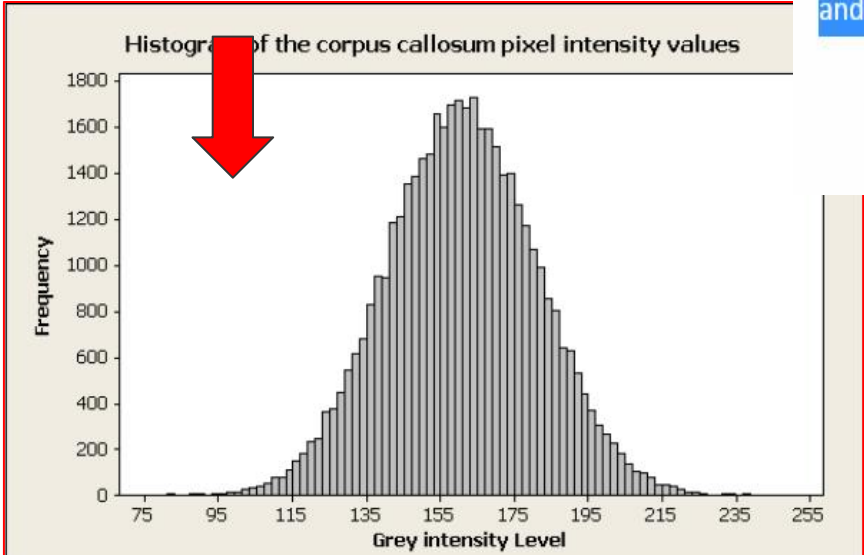
直方图参数:Ecotext 3或Test 3

ECOTEXT 3参数对应灰度的平均水平，即研究区域内所有像素的灰度水平的平均值

- 值低于80表示低回声性(↑Ecotext 1)
- 值高于100表示低回声性(↑Ecotext 2)

临界值（猪）：80-100

其他物种：（80-110）



The newly developed Fertiboar technology is based on the analysis of boar testicular ultrasound pictures which reflect characteristics of the sperm producing tissue (Theriogenology 158 (2020): pp 58-65). A machine learning approach (Convolutional Neural Network) was used to identify regions within the testicular pictures that are key to semen production. Those regions were analysed to calculate parameters describing novel attributes like the **homogeneity and echogenicity of the tissue.**

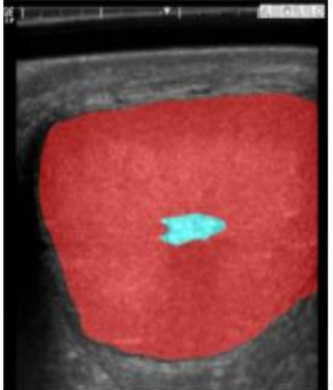


Abbildung 1: Identifizierung des Spermien-produzierenden Gewebes

ECOTEXT软件工作原理

低回声区域：平均直径和感兴趣区域的面积

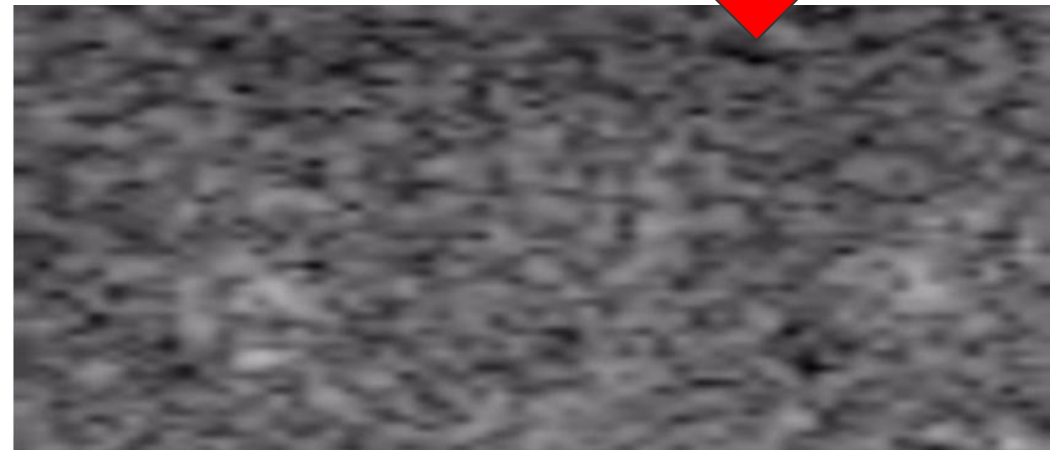
ECOTEXT在睾丸实质图像上应用了几种滤波器，并在修改后的图像上研究低回声区域的密度、总面积(%)和平均直径。

低回声区(HA)反映功能完整的精细管的存在和比例。

面积的临界值：ROI的低回声区域面积应在6-15%之间。小于6%则表明大精细管、睾丸退化、纤维化等的比例较低

大于15%表示接触不良(伪影)、细胞密度低、水肿、睾丸炎等。

低回声区域平均直径的临界值：对于健康的成年动物来说，这些结构的直径(较小的直径)应该在90-150微米之间。



ECOTEXT软件工作原理

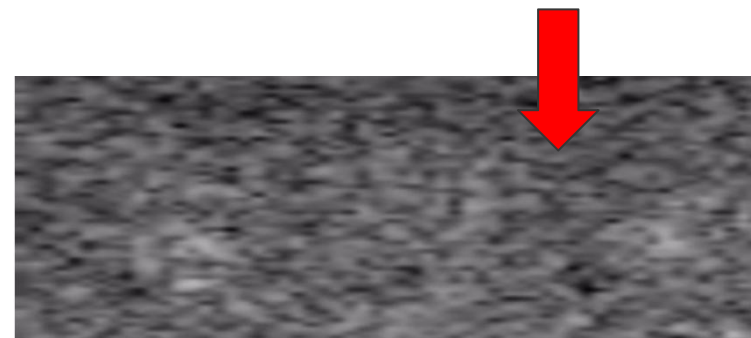
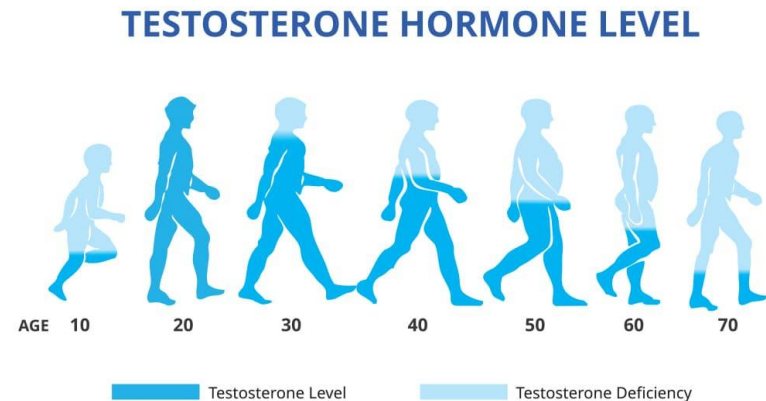
低回声区域：密度

AH密度是ECOTEXT参数中最具预测性的参数。

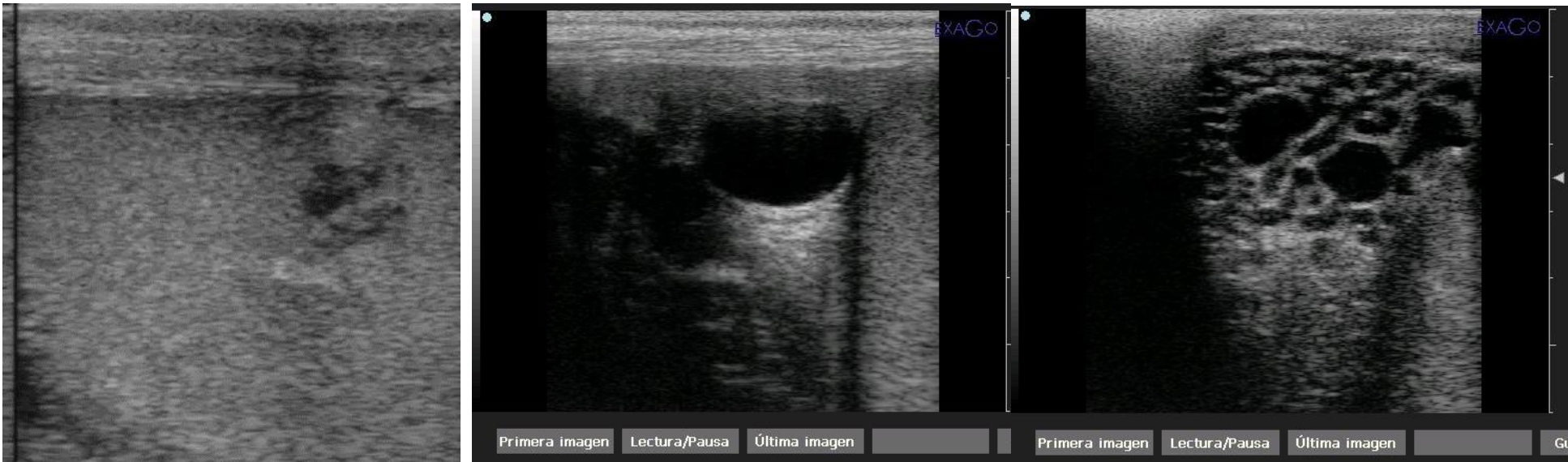
它会在青春期前上升，然后在成年期开始缓慢下降(似乎与睾丸激素水平有关)。睾丸退变过程中逐渐减少(可逆或不可逆)。

临界值:精子质量特别好的动物睾丸的低回声区域密度值大于150 AH/cm²。原发性精液异常形式的动物，其数值在100到150之间。小于100 AH/cm²的动物通常日龄要么太小(青春期左右)，要么由于GNRH减少、体温升高或两者兼有导致的睾丸退化。

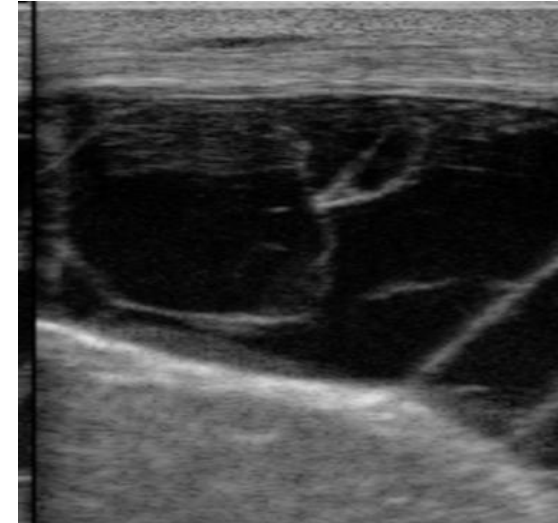
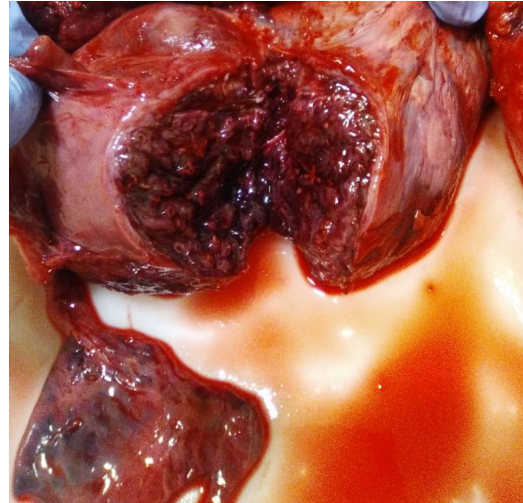
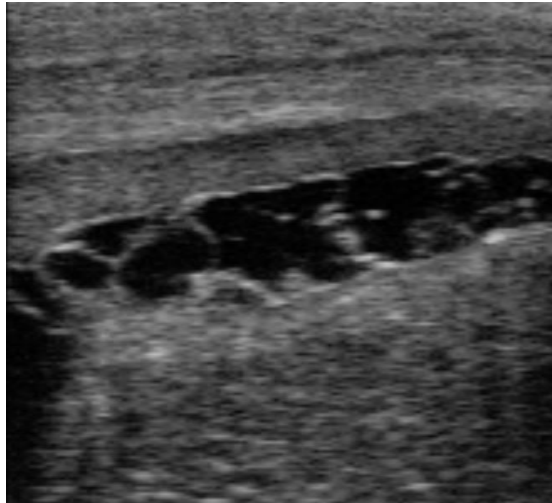
睾丸退变可能是可逆的，也可能不是可逆的，这取决于: 是否存在纤维化或透明化和/或存在功能性精原细胞。逆转的时间将从生精周期一直到触发原因消失后的将近一年。这一时间反过来将取决于原因的持续时间和严重程度。



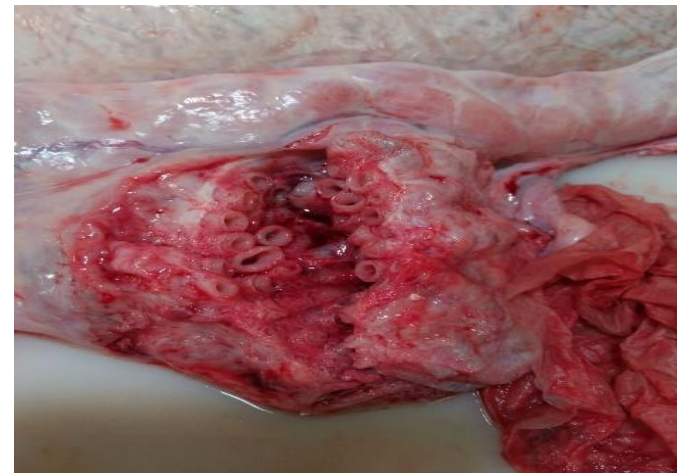
利用超声技术发现病变



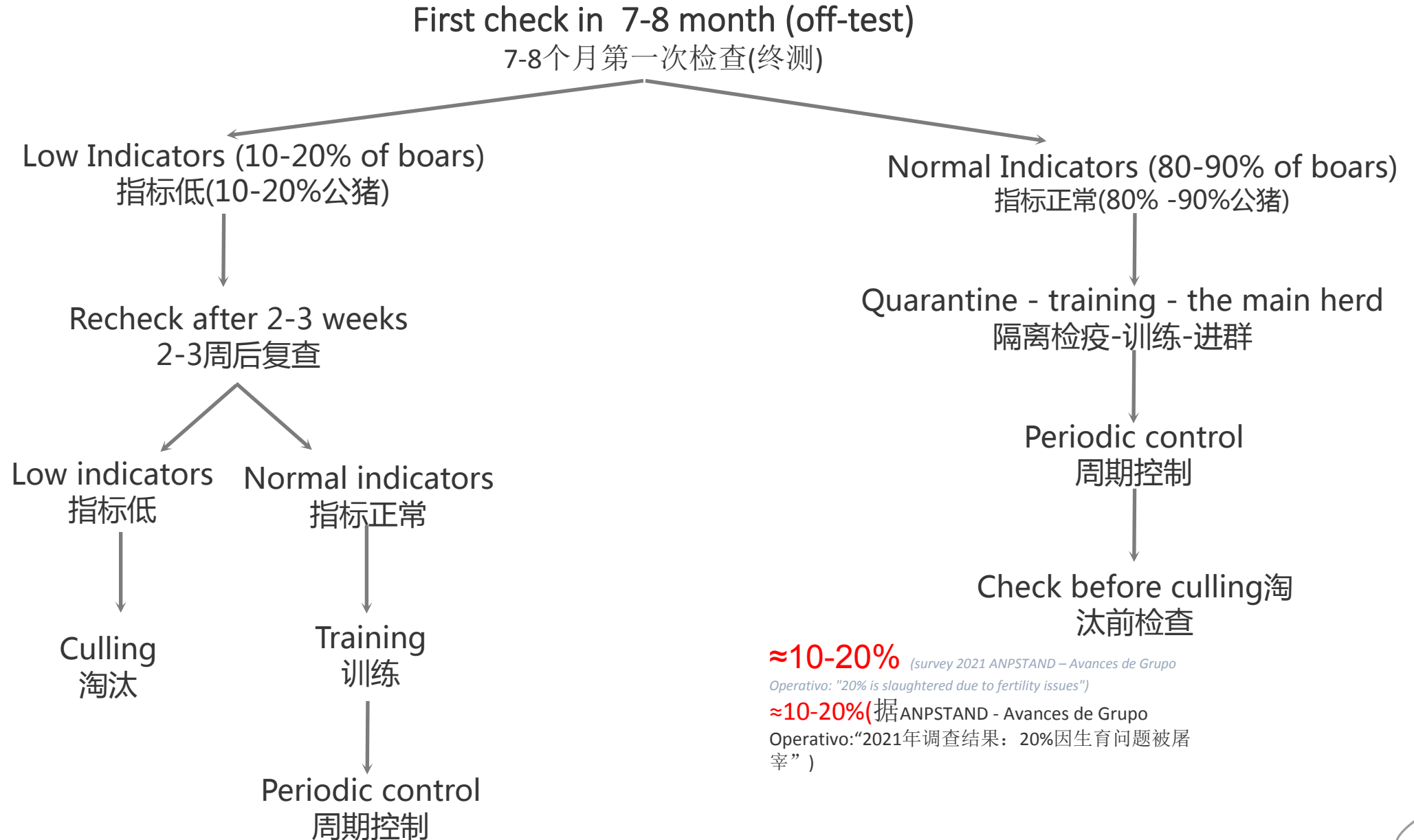
Testiculitis 睾丸炎



Varicocele 精索静脉曲张



Recommended Protocol 推荐协议



Semen quality and density of HA/cm² in the testis of Young boars (8-10 months)

	VOLUME (ml)	CONCENTRATION Spz/ml x 10 ⁹	MOTILITY (%)	NORMALITY (%)	PROXIMAL DROPLETS (%)	PRODUCED DOSES
<u>Until</u> 100 HA/cm ² (n=20)	214,9±102,4	5,9±3,0	79,7±24,3	69,9±17,4	6,8±6,0	16,3±11,5
More <u>than</u> 100 HA/cm ² (n=103)	212,1±140,2	6,8±3,7	91,7±7,1	74,7±14,1	3,4±3,3	21,4±10,5
P	NS	NS	0,000	NS	0,000	0,05

以下是对123头8-10个月大的西班牙公猪的试验数据。

ECOTEXT软件工作原理

Age	EC1	EC2	EC3	Area	Diameter	Density
6	0	721	121,6	2,7	68,0	108,6
7	0	761	122,1	2,8	70,1	113,1
8	0	750,5	121,8	2,8	67,4	109,9
9	0	152	111,0	3,0	71,2	119,0
10	0	7	97,1	5,0	82,9	126,9
11	0	4,5	97,7	4,2	77,0	134,0
14	0	8	101,8	5,1	80,5	141,0
Adult	2	2	90,7	7,9	97,0	154,9

年轻的公猪，从青春期到成熟期，AH/cm²的密度随公猪的年龄增加而增加。

ECOTEXT软件工作原理

	EC1	EC2	EC3	Área AH/cm2	Diameter AH/cm2	Density AH/cm2
More than 30% Major sperm anomalies (n=13)	14,38±32,28	186,18±257,8	100,95±14,61	5,69±4,61	90,18±33,71	116,23±30,14
20-30% Major sperm anomalies (n=8)	6,41±6,73	65,03±76,37	93,79±8,45	7,05±2,94	92,96±18,31	140,22±32,64
Less than 20% Major Sperm anomalies (n=91)	3,46±6,33	57,14±104,97	94,31±8,83	7,02±2,51	93,12±13,77	145,67±18,46
Sig.	0,13	0,05	0,66	0,289	0,850	0,000

逻辑回归分析表明睾丸超声图中低回声区域的密度可以预测精液样本的生育能力的强弱。用AH/cm2指标值小于80的来识别低生育力公猪，灵敏度为100%，特异性为83.5% (n= 112头成年公猪)。

ECOTEXT优势

Genetic enterprises



Research



Camel Reproduction Centre
P.O. Box 79914, Dubai, U.A.E



Artificial Insemination Centers
Cooperatives Vets



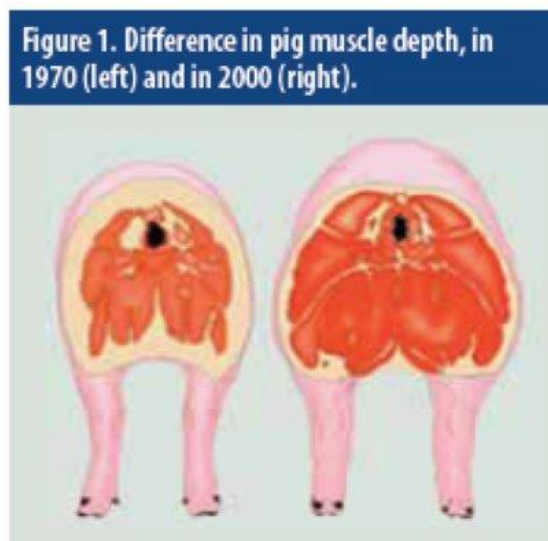
肌间脂肪测量软件—Biosoft



背膘、眼肌面积和肌间脂肪

1985年以前，市场上90%的生猪是作为传统的“商品猪肉”出售的，价格是根据活重确定的(Hayenga, 1985年)。

对于寻求生猪附加值的生产者来说，利用基于激励的营销系统变得越来越重要，从而增加了瘦肉率的选择。因此，以胴体质量为基础出售的生猪比例在1988年上升到28%，1997年上升到78% (brosenet al., 1998)。



University of Missouri - 2001



背膘、眼肌面积和肌间脂肪

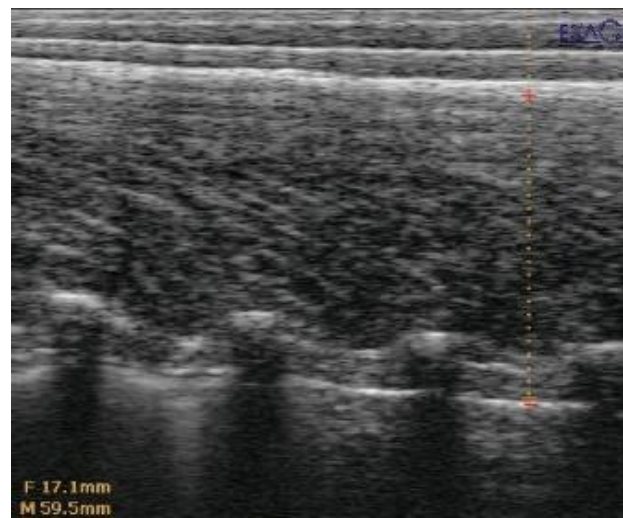
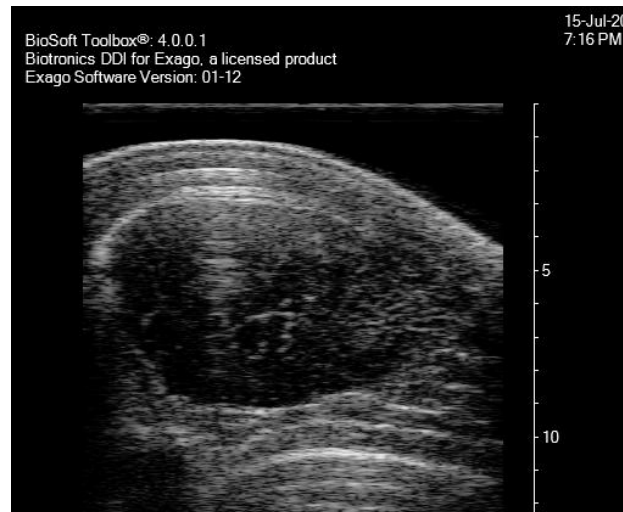
在第10和第11肋界面处发现了整体胴体脂肪和肌肉的最可靠指标;猪一般有14根肋骨，但也可能多达17根。

横切图像测量：

- 眼肌深度
- 眼肌面积
- 背膘厚度
- 不能测量肌间脂肪

纵切图像肌内脂肪测量

- 背膘厚度
- 眼肌深度
- 肌间脂肪: 2 ROI





新趋势：肌间脂肪测量

- 另一个可能的数据是肌内脂肪;它可以改善肉质，获得更多多汁的猪肉。
- **随着IMF水平的提高**，你会得到更多的大理石纹和更好的味道
- 然而，多年来的趋势是背部脂肪减少，这反过来又减少了腰部的大理石纹。现在，随着消费者追求更好的饮食质量，他们的目标是在肌肉中恢复更可接受的脂肪水平，但又不会增加过多的背部脂肪，否则会对生产商不利。

MARBLING STANDARDS²



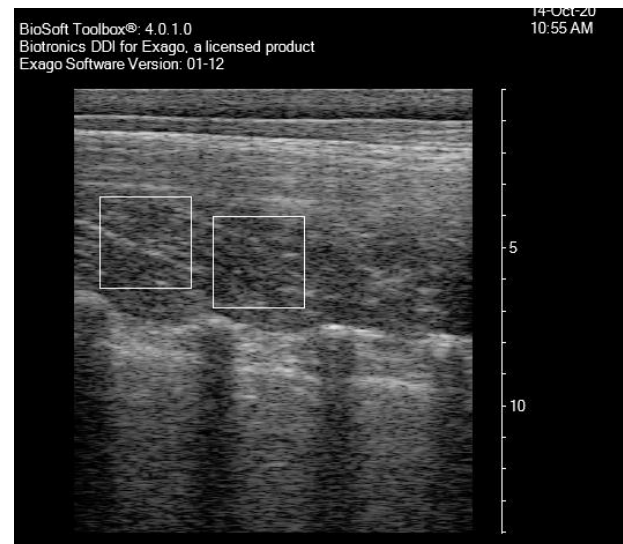
Courtesy of the National Pork Board, Des Moines, IA.



兼容软件

Biosoft

- IMF软件(Bio Soft Toolbox III)的新应用也正在研究中。例如，研究如何将国际货币基金组织的软件集成到屠宰场生产线上的工作已经在进行中。通过快速识别胴体中特定水平的腰部大理石花纹，扫描仪将使胴体能够定向到高肉类食用质量线。这样，加工者和生产者都将从高质量生猪的销售中受益。



Source:french alibaba 2017



BioSoft Toolbox® for Swine 4.0.1.1 © 2007-2020 by Biotronics, Inc.

File Tools Options Help

(N) Next Animal

Image Capture Tools
(S) Stream (F) Freeze
(C) Capture Image

Scanner Setup
Depth: 14cm
Probe Size: 13cm

Image Interpretation Tools
 (I) IMF
of ROI: 2
ROI Size: 66
 w/ Depth Assist
 (R) Area
 (D) Fat Depth
(A) Assist With Depths

Sort By Scan Time

Animal List
16-4
23-12
24-9
24-10
27-1
28-1
28-6
28-9
28-10
29-1

Animal Information
ID: 28-10
IMF: 0.3
Area: 6.83
Fat Depth: 0.49
Loin Depth:
Weight: 232
Sex: 2
Breed: Berkshire
Farrow Date:
Sire:
Comments:

14-Oct-20 10:57 AM
BioSoft Toolbox®: 4.0.1.0
Biotronics DDI for Exago, a licensed product
Exago Software Version: 01-12

Images Image Data In English Units
1 2 3 4 5

Animals: 35 Animals w/ Images: 35 Pixel Value: 0 Hardlock Count: 6144 File Version: 4.0.1.0 Session Folder: Z:\BioQProc\Previous Years\2020\AJC Berkshire...

多ROI的IMF处理，灵活的ROI大小和改进的预测模型。

BioSoft Toolbox[®] 4.0

Biotronics Inc.
Ultrasound Solutions

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File Tools Options Help

(N) Next Animal

Image Capture Tools
(S) Stream (F) Freeze
(C) Capture Image

Scanner Setup
Depth: 14cm
Probe Size: 13cm

Image Interpretation Tools
 (I) IMF
of ROI: 2
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Sort By Scan Time

Animal List
16-4
23-12
24-9
24-10
27-1
28-1
28-6
28-9
28-10
29-1

Animal Information
ID: 28-10
IMF: 0.3
Area: 6.83
Fat Depth: 0.51
Loin Depth: 2.54
Weight: 232
Sex: 2
Breed: Berkshire
Farrow Date
Sire
Comments

Images Image Data In English Units
1 2 3 4 5

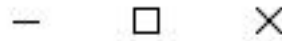
Animals: 35 | Animals w/ Images: 35 | Pixel Value: 0 | Hardlock Count: 6144 | File Version: 4.0.1.0 | Session Folder: Z:\BioQProc\Previous Years\2020\AJC Berkshire...

自动脂肪和肌肉深度协助纵向
图像。

BioSoft Toolbox[®] 4.0

Biotronics Inc.
Ultrasound Solutions

B Depth Assist Settings



Measurement Locations

Last Rib - Depth measurement taken anterior of the last rib

- Between second to last rib and third to last rib
- Between third to last rib and fourth to last rib
- From second to last rib to fourth to last rib

10th Rib - Depth measurement taken posterior to the trapezius muscle

- Between 10th and 11th Rib
- Between 11th and 12th Rib
- Between 12th and 13th Rib
- Between 11th and 13th Rib

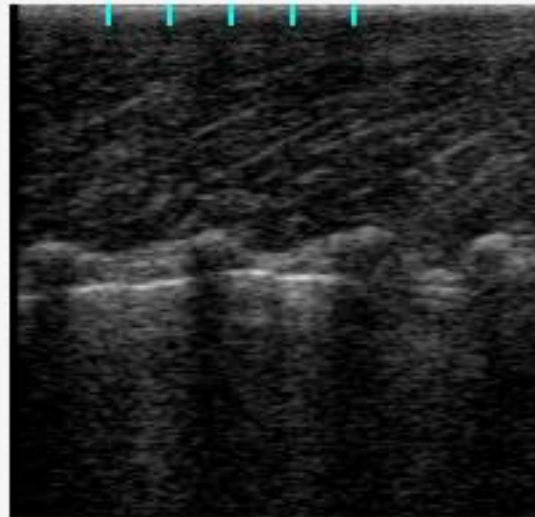
Note: Rib numbers are approximate for market weight pigs and start from the same side as the trapezius muscle.

Trapezius Muscle Location

- Left
- Right

Intercostales

- Include in loin depth



OK

Cancel

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多种选择自动脂肪和眼肌深度辅助测量。

BioSoft Toolbox[®] 4.0

Biotronics Inc.
Ultrasound Solutions

The screenshot displays the BioSoft Toolbox 4.0.1.1 interface for Exago. The main window shows an ultrasound image of a pig's back with a yellow vertical line indicating a manual fat depth measurement. The software version is 4.0.1.0, and the date/time is 14-Oct-20 10:56 AM. The interface includes a menu bar (File, Tools, Options, Help), a toolbar with buttons for (N) Next Animal, (S) Stream, (F) Freeze, (C) Capture Image, and (A) Assist With Depths. The left sidebar contains sections for Image Capture Tools, Scanner Setup (Depth: 14cm, Probe Size: 13cm), Image Interpretation Tools (IMF, Area, Fat Depth), and an Animal List. The right sidebar shows Animal Information for ID 28-10, including IMF (0.3), Area (6.83), Fat Depth (0.50), Loin Depth (2.54), Weight (232), Sex (2), and Breed (Berkshire). The bottom status bar shows 35 animals, 35 images, and the session folder path.

Animal Information

ID	28-10
IMF	0.3
Area	6.83
Fat Depth	0.50
Loin Depth	2.54
Weight	232
Sex	2
Breed	Berkshire
Farrow Date	
Sire	
Comments	

Animal List

- 16-4
- 23-12
- 24-9
- 24-10
- 27-1
- 28-1
- 28-6
- 28-9
- 28-10**
- 29-1

Images: Image Data In English Units

- 1
- 2
- 3
- 4
- 5

Animals: 35 | Animals w/ Images: 35 | Pixel Value: 0 | Hardlock Count: 6144 | File Version: 4.0.1.0 | Session Folder: Z:\BioQProc\Previous Years\2020\AJC Berkshire...

手动脂肪深度测量。

BioSoft Toolbox[®] 4.0

Biotronics Inc.
Ultrasound Solutions

BioSoft Toolbox[®] for Swine 4.0.1.1 © 2007-2020 by Biotronics, Inc.

File Tools Options Help

(N) Next Animal

Image Capture Tools
(S) Stream (F) Freeze
(C) Capture Image

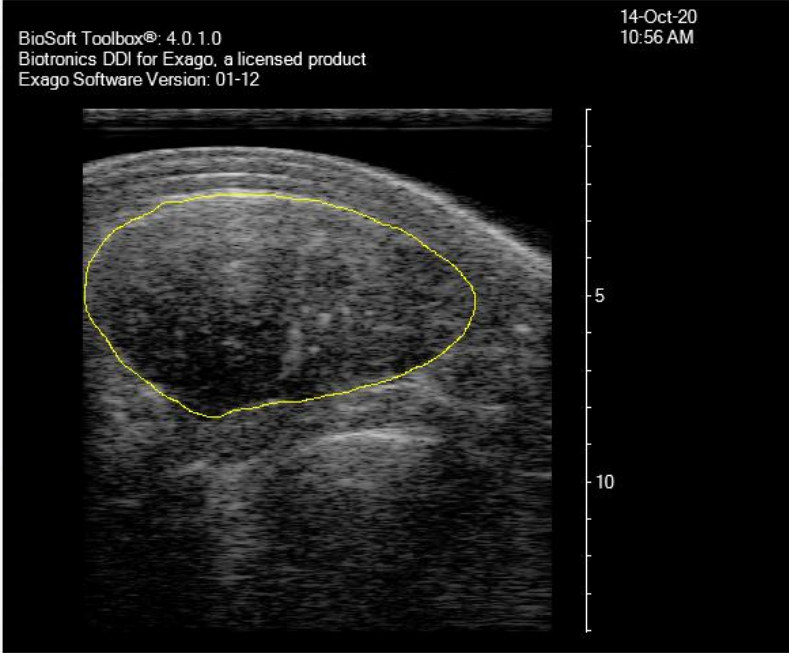
Scanner Setup
Depth: 14cm
Probe Size: 13cm

Image Interpretation Tools
 (I) IMF
of ROI: 2
ROI Size: 66
 w/ Depth Assist
 (R) Area
 (D) Fat Depth
(A) Assist With Depths

Sort By Scan Time

Animal List
16-4
23-12
24-9
24-10
27-1
28-1
28-6
28-9
28-10
29-1

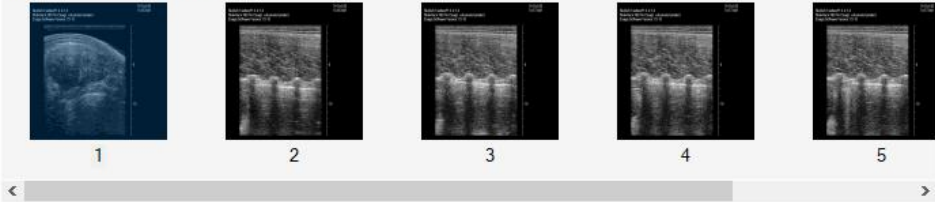
14-Oct-20 10:56 AM
BioSoft Toolbox[®]: 4.0.1.0
Biotronics DDI for Exago, a licensed product
Exago Software Version: 01-12



Animal Information

ID	28-10
IMF	0.3
Area	7.16
Fat Depth	0.50
Loin Depth	
Weight	232
Sex	2
Breed	Berkshire
Farrow Date	
Sire	
Comments	

Images Image Data In English Units



Animals: 35 | Animals w/ Images: 35 | Pixel Value: 0 | Hardlock Count: 6145 | File Version: 4.0.1.0 | Session Folder: Z:\BioQProc\Previous Years\2020\AJC Berkshire...

手动眼肌面积测量。



IMV TECHNOLOGIES. FOR LIFE.

敬请大家批评指正！！

Thanks for your attention!!