

PRACTICAL PROTOCOL FOR THE ASSESSMENT OF BOARS PRODUCING SEMINAL DOSES

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INTRODUCTION

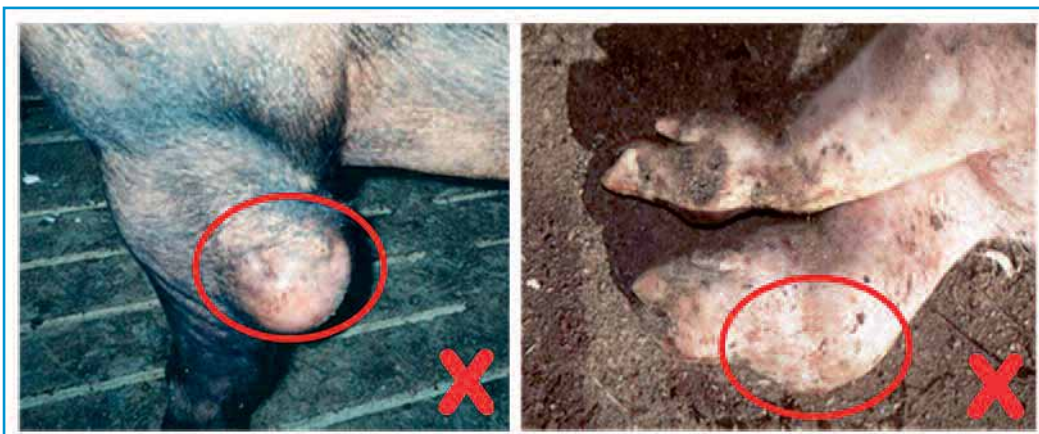
Boars for artificial insemination cover a large number of females. Any problem that affects reproductive activity of the boars and which is not detected early enough, has a negative impact either on the productivity of the stud or the farm. Boar fertility is the result of three parameters: libido, mounting ability and semen quality. In the process of evaluating boars whose destination is the production of semen doses, special attention has to be drawn to such aspects as:

1. Health: It is important to check that the source of animals is safe and free of disease.
2. General status of the animal: Production parameters (conversion rate, conformation, etc.) legs, puberty and other reproductive traits

3. Acclimatization and quarantine: duration approximately 2 months.
4. Beginning of reproductive activity: after the age of 8 months.
5. Seminal quality: Defined by the motility, concentration and sperm morphology. In this paper we review the important points to consider when evaluating the reproductive capacity of a boar for an artificial insemination center.

PHYSICAL EXAMINATION OF THE ANIMAL

It is the first point of the protocol for assessment of a semen donor. The physical examination should rule out any condition that may affect the reproductive capacity of boars. The animal's general condition (body condition, structure and functioning of the musculoskeletal system) is an indicator of the absence / presence of diseases that may result in the



Picture 1.
Extremity
injuries

onset of lameness (Picture 1) that prevent or hinder the mounting of the dummy. Furthermore, a careful examination of the genitals (testicles, penis, prepuce) should be performed to rule out injuries, malformations or any anomalies (Pictures 2 and 3). It is advisable for boars intended for the breeding program to have attained the age of 8 months, when they reach puberty.

Parameters to evaluate

- a. Body condition: the weight of boars at 8-9 months of age should be about 170 kg.
- b. Musculoskeletal examination:
 - legs and correct hoof.
 - walking features: discard mainly lameness.

- c. Examination of the genital tract:
 - Testicular size: young males, minimum dimensions, 8 cm long and 5 cm in diameter.
 - Symmetry of the testicles (<1cm difference in diameter).
 - consistency of the testicles firm to move freely in the scrotum
 - Penis and prepuce: injury free.

SEMEN COLLECTION

Libido and sexual behavior (ability to mount and ejaculation) are evaluated for semen collection. Here it is very important to observe the behavior and the reactions of the boar to the dummy, as well as the mounting and length of ejaculation. Aberrant sexual behavior may result in male infertility.



Picture 2. Asymmetry of testicles (left) and normal testicles (right)



Picture 3. Injured prepuce (left) and normal prepuce (right)

Parameters to evaluate

a. Libido: time it takes to mount the dummy. Assessed from the boar entering the room until jumping on the dummy for collection. Boars with low libido, not interested in the dummy or easily distracted should be examined for possible injuries or diseases, and together with semen quality their eligibility of producing semen should be determined (Figure 4). The boars are to be scored with 1, 2 or 3 crosses:

- 1 cross: low libido, no interest in the dummy and does not attempt to mount after 10 minutes.
- 2 crosses: good libido, interest in the dummy although distracted and it takes between 5-10 minutes to mount.

- 3 crosses: excellent libido, interest in the dummy and fast mounting, less than 5 minutes (Picture 5).

b. Behavior during ejaculation: appearance of the penis, duration of ejaculation and observation of the behavior of the boar (Nervousness, attempts to get off from the dummy, etc.) (Picture 6). To be evaluated from 1 to 3 crosses:

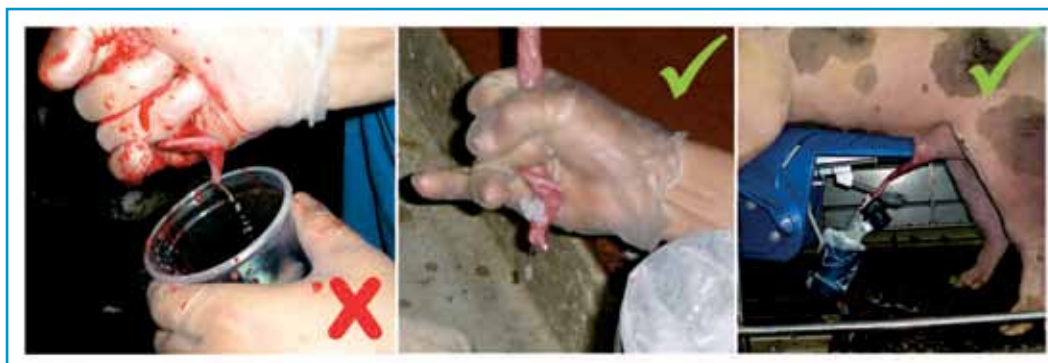
- 1 cross: bad behavior. Short ejaculation time (Less than 3 minutes) and nervousness or anxiety symptoms.
- 2 crosses: good behavior. Ejaculation time is 3-5 minutes.
- 3 crosses: high performance. Ejaculation time is more than 5 minutes.



Picture 4. Boar with low libido and without interest in the dummy (left) and with high libido (right)



Picture 5. Sequence of boar behavior in front of the dummy. The duration from the entry to the collection room till mounting the dummy is around 5-10 minutes



Picture 6. Boar behavior and semen appearance should be observed during ejaculation. The presence of blood in semen is a cause to discharge the ejaculated and in serious cases even the boar.

SEMINAL QUALITY

Sperm quality (based primarily on the motility, concentration and morphology) can vary from short periods of time, so that if the boar does not meet the minimum does not mean that semen quality is not suitable for reproduction. Race, libido and sexual behavior affects semen quality. Therefore the review period should be extended a minimum of

6 weeks, performing collections once per week.

The ejaculates must meet minimum quality standards (Table 1). It should be kept in mind that if the variability among ejaculates is high the minimum number of ejaculates should be increased to 10 per animal (Table 2).

Table 1. Reference values for young boars (up to 12 months)

PARAMETERS	≤ 9 months	> 9 months
Volume (without gel fraction)	100 ml	150-200 ml
Color	white milking	white creaming
Odor	neutral	neutral
Motility	70%	>80%
Progressive Motility	65%	>70%
Concentration	0.15 x 10 ⁹ sperm/ml	0.2 x 10 ⁹ sperm/ml
Total abnormal forms	≤25%	≤20%
Head	≤1%	<1%
Cytoplasmic droplets	≤20%	<15%
Tails	≤3%	<3%
Others	≤1%	<1%
Acrosomes	≤20%	<20%

Parameters to evaluate

a. Macroscopic

- Volume: will be assessed by weight using an electronic scale; unit measurement is gram = ml.
- Color: visual assessment (Picture 7).
- Odor: olfactory assessment

b. Microscopic:

- Concentration: Sperm count /ml. Counting by spectrophotometer or CASA system (Picture 8).
- Motility: measured by optical microscope, scale from 0 to 100% (subjective evaluation) or CASA system (objective evaluation).
- Progressive motility: measured by CASA system (objective evaluation).
- Agglutination: measured by optical microscope, scale 1 to 3
- Morphology: assessed by phase contrast microscope on a scale from 0 to 100% (Picture 9) or CASA

Table 2. Control record for young boar seminal quality

PARAMETER	Age 1 ^o collection:					
	EYAC 1 Date: 00/00/00	EYAC 2 Date: 00/00/00	EYAC 3 Date: 00/00/00	EYAC 4 Date: 00/00/00	EYAC 5 Date: 00/00/00	EYAC 6 Date: 00/00/00
Volume						
Color						
Odor						
Motility						
Progressive Motility						
Agglutination						
Contamination						
Concentration						
Total Abnormal Forms						
Head						
Acrosomes						
Citoplasmatic drops						
tails						
Others						
24 hours Preservation						
Motility						
Progressive Motility						
Agglutination						
Contamination						
Total Abnormal Forms						
Head						
Acrosomes						
Citoplasmatic drops						
tails						
Others						
48 hours Preservation						
Motility						
Progressive Motility						
Agglutination						
Contamination						
Total Abnormal Forms						
Head						
Acrosomes						
Citoplasmatic drops						
tails						
Others						
72 hours Preservation						
Motility						
Progressive Motility						
Agglutination						
Contamination						
Total Abnormal Forms						
Head						
Acrosomes						
Citoplasmatic drops						
tails						
Others						

system (automatic measurement with motility and concentration; objective evaluation).

- Preservation test at 24, 48 and 72 hours (depending on the extender used). Rate motility, type of movement, agglutination and morphology.



Picture 7. Abnormal color of the ejaculated (left, middle) is an indicator of seminal pathology



Picture 8. Components and image of the CASA system with automorphology (cytoplasmic droplet and tails are pointed with a box)

c. Microbiological examination. Bacteria are „normal“ components of a boar ejaculate. The main contaminants identified in the raw ejaculate are rooted in the fecal or preputial fluid. The mechanism of action by which the bacteria damage the sperm, is usually based on spermicidal effect, binding to

the surface of the sperm and facilitate clumping of the cells:

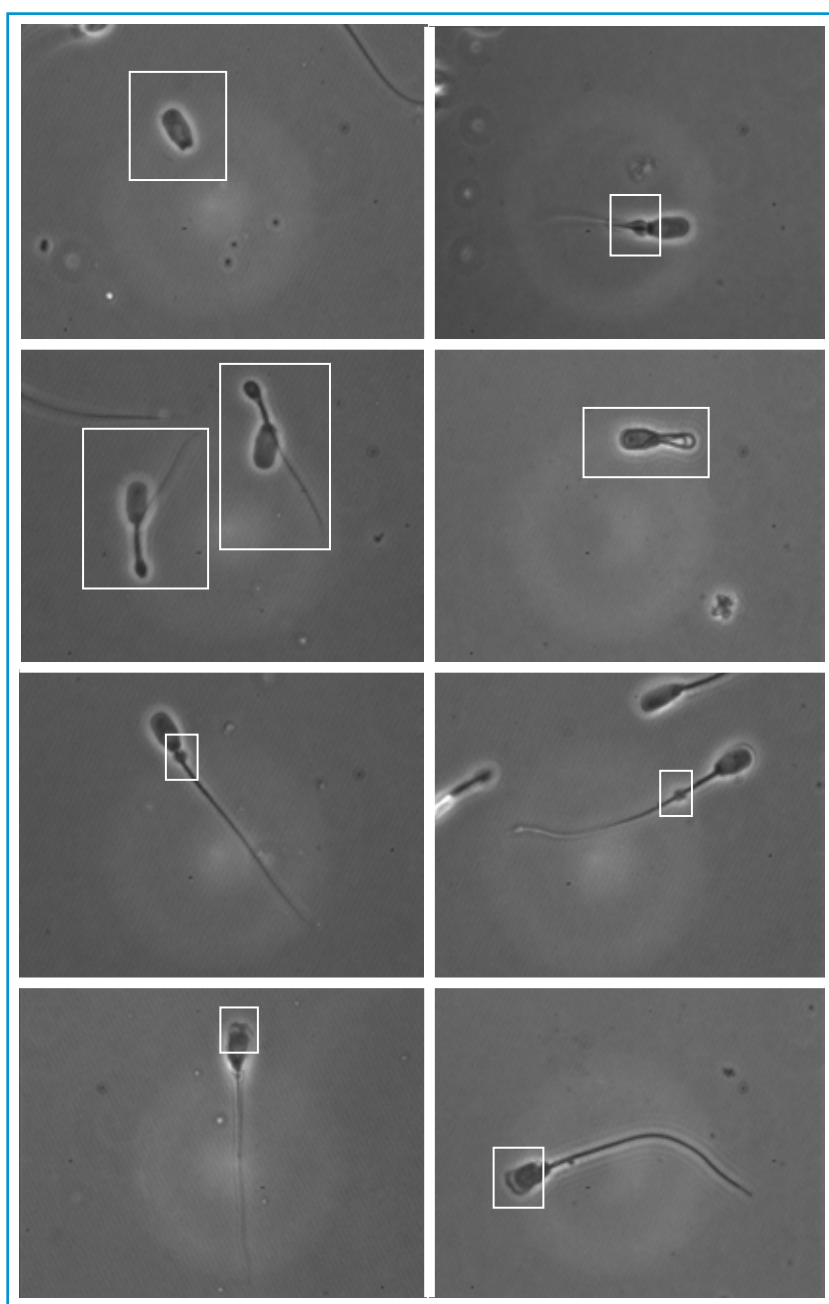
- It is important to include the culture of total aerobic and whole bacteria in raw semen into the protocol for boar assessment.
- It is also recommended to control the semen once it is diluted and after 48 hours of preservation.

REFERENCES

Can be requested from the author.

ACKNOWLEDGEMENTS

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Picture 9. Abnormal forms are more frequent in boar semen (Pictures taken 100x immersion objective by CASA Sperm Vision)