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A REVIEW ON BREEDING SOUNDNESS EVALUATION OF BULLS

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ABSTRACT

Reproduction in cattle livestock is the essential prerequisite for production and thus for potential economic gain. Veterinarians are called upon to examine the male animals for the diagnosis of the infertility and to ascertain whether the animal will have a level of fertility that is adequate for the purpose for which it is used. A Breeding Soundness Evaluation (BSE) is intended to be a systematic and thorough examination of the bull that will lead to an estimation of the bull's fertility on the day examined. The breeding record of a bull is important, but it does not guarantee performance in the upcoming breeding season. Many factors can influence the fertility of a bull both during the breeding season and during the resting period. Also, the bull should be evaluated for past medical history with husbandry management before beginning of the BSE. The new guidelines for evaluating and classifying bulls include: general and reproductive physical examination, Libido and serving capacity, and semen collection and evaluation. The Breeding Soundness Examination should be conducted by a trained and experienced professional in order to obtain reliable and repeatable results. Interpretation of findings requires knowledge of the animal's health and physical status, a careful evaluation of the Libido, reproductive system, and an examination of semen. The common reproductive disease concerns are the contagious, venereal, post-breeding diseases trichomonas and campylobacter (or vibriosis). The Bull Breeding Soundness Evaluation represents a relatively quick and economic procedure to screen bulls prior to their sale or use. Its objective is to establish baselines, or

thresholds, above which bulls would be regarded as satisfactory potential breeders. As it is intended for wide application with a variety of breeds in different environments, it needs to be simple, repeatable and unambiguous.

Keywords: Bull, Bull Breeding Soundness Evaluation, Semen.

1. INTRODUCTION

The term "breeding sound" is frequently used to describe a bull's ability to get cows pregnant and a breeding soundness evaluation is a prediction of a bull's potential reproductive capacity based on standard measurements and interpretations of certain selection criteria that are related to the desire and ability to breed and to fertility based on measurements of testicular development and certain seminal characteristics [24]. Bull breeding soundness evaluations (BBSE) are conducted by veterinarians to determine a bull's capacity to sire calves under natural mating management. Accurate conduct and reporting of BBSE enables veterinarians, bull buyers, owners, and managers to make appropriate bull selection and management decisions [3].

Evaluating the fertility of bulls prior to use as breeding animals would make obvious economic sense if it were possible. The breeding soundness evaluation (BSE) is a practical method to identify bulls with less than satisfactory breeding potential. This evaluation should be conducted on every bull at least 30 to 60 days before each breeding season to allow enough time for replacement of deferred or unsatisfactory bulls [21]. A Breeding Soundness Evaluation (BSE) is intended to be a systematic and thorough examination of the bull that will lead to an estimation of the bull's fertility on the day examined [41]. The new guidelines for evaluating and classifying bulls for breeding soundness was formulated based on the latest scientific information [48]. Bull BSE comprises general and reproductive organs examination, scrotal circumference indexed for age, semen motility and sperm morphology examinations [2]. It is also important to examine libido and Examination for the Venereal Diseases [56], even though these steps are not usually included in the BBSE. There is strong evidence that demonstrates that bulls should be tested for serving ability before the beginning of the breeding season to avoid the selection of unfit bulls [37].

BSE outcomes and components are consistently linked favorably with fertility measures [31]. The breeding soundness evaluation is generally used for naturally serving beef bulls, although it also applies to dairy and beef bulls used for artificial insemination purposes with cryopreserved semen [6]. The capability of bulls to distribute their genetics is dependent upon their fertility, whether they are used for natural breeding or A.I. In turn, herd reproductive performance has been shown to have a greater impact on economic returns than either growth rate or product quality [73]. A properly performed and interpreted evaluation provides a useful management tool to reduce the risk of sub-fertile bulls in the herd [55]. Therefore, reproductive success will continue to depend mainly on the capacity to evaluate all available information coming from BBSE [32]. Breeding soundness evaluation is a series of tests to identify bulls that have potential for satisfactory fertility [43].

The objective of this paper is:

- To give information on how to evaluate a bull's potential reproductive capacity.
- To highlight the importance of breeding soundness examination of bulls
- To give a practical method on breeding soundness evaluation (BSE).
- To give a strong evidence before the beginning of the breeding season to avoid the selection of unfit bulls.

2. REVIEW OF LITERATURE

2.1. Importance of Breeding Soundness Examination of Bulls

Animals are usually presented for a breeding soundness exam for four basic reasons. The first reason is a prebreeding exam. Bulls are examined, usually a month before breeding, so that one knows for sure that they are normal before they are placed in with females [13]. The second reason for a BSE is during the breeding season when an abnormal number of females are returning to estrus. A third reason is a pathology consideration in which the bull is suffering from frost bite, testicular swelling, an inability to service, or a systemic disease. The final reason for a BSE is a presale exam, thus making sure the animal is a sound potential breeder before the bull is sold in the ring [42].

2.2. Recording the Husbandry and Detailed Medical History of Bulls

The bull should be evaluated for recording the husbandry and past medical history before beginning of the BSE. The basic information includes the age, breed, identification number, vaccination given and site of administration, fever, retained testicle, hernia and incidence of chronic debilitating diseases. All these factors significantly affect the sperm production ability and quality of semen of particular bull. Moreover, information related to the evidence of pain during mounting was also recorded [48]. Clinical illness, lameness and significant body condition changes in the past 2 to 4 months should be noted. The levels of concentrate feeding in the past 4 months and details of the bull's previous reproductive performance should be recorded [54].

2.3. Breeding Soundness Evaluation Guidelines

2.3.1. General and Reproductive Organs Examination

2.3.1.1. General Health Examination

Breeding soundness examinations are not meant to be health examinations. It is taken for granted that bull health, like the health of all other herd members, is the concern of the producer, who is responsible for detecting any signs of health problems. By virtue of their training, however, clinicians should intuitively be alert for abnormalities in a bull's attitude, general appearance, body condition, and fecal characteristics that may warrant further investigation into the health of the animal presented for fertility evaluation. Because of bulls rely mostly on vision to detect cows in heat, and the development of squamous cell carcinoma or corneal opacity due to pinkeye is common, special emphasis is placed on examining the eyes. It is obvious that the general health of a breeding bull is important, since sick animals will be less active and fever should be avoided since this will negatively influence semen quality. Moreover, a bull suffering from an infectious disease might infect the female herd, which in turn might harm the reproductive performances of the cows [60].

2.3.1.2. Skeletal Soundness

Besides the general health, a sound conformation of the feet and legs problems that have a hereditary basis of a bull is imperative to obtain a good breeding outcome. An effort must be made during the breeding soundness evaluation to watch the bull walk [52]. Bulls with rear leg impairment may not move around freely to detect cows in oestrus or may be unable to mount successfully, since during copulation most of the bull's weight is borne on the hind legs and feet [16]. Furthermore, it has been demonstrated that even in bulls without clinical symptoms of lameness, joint lesions should be taken into consideration as a contributory cause of reproductive failure [62]. Additionally, a bull should be free of mouth abnormalities or deformities and have adequate teeth to allow him to sufficiently feed during the breeding season to avoid excessive weight loss. Body condition should therefore be monitored, and both over fitted and under fitted bulls should be avoided [6].

Prepuce: The prepuce should initially be visually inspected for evidence of preputial prolapsed. When examining the external orifice, careful attention should be paid to precipitated crystals on the hairs, since they suggest the presence of urinary calculi predisposing bulls to urethral obstruction and even rupture, making a bull unsuitable for breeding. Next to the visual inspection, a thorough palpation of the entire external preputial sheath should be performed to examine whether scars, lacerations, adhesions, stenosis or preputial enlargements are present. Preputial problems leads to phimosis and paraphimosis [16].

Penis: The best way to examine the penis is immediately after natural mating prior to penile retract into the prepuce, or before and after semen collection by means of an artificial vagina. Since, in case of electro-ejaculation and/or manual protrusion, artificial deviations may occur. The extended penis should be examined for the presence of fibropapillomas, hair rings, and penile deviations. Phimosis and paraphimosis, both secondary conditions, are unacceptable for breeding bulls [40].

Seminal vesicles: Craniolateral to the prostate, on both sides, the seminal vesicles can be palpated as grape like turgid, easily mobile clusters, approximately 2 – 6 cm in width and 6 – 15 cm in length. A common finding here, which can result in high numbers of white blood cells and even in pus in the semen, is seminal vesiculitis, generally unilateral but possibly bilateral. This generally produces no external signs of

illness, but results in increased size and firmness of the glands (finally leading to fibrosis), loss of lobulation and pain on palpation. Exceptionally, congenital defects such as aplasia or hypoplasia can occur, but this is often accompanied by aplasia of other segments of the reproductive tract [18].

Scrotum and its contents: Both a visual inspection and palpation of the scrotum (and its contents) should be performed. This visual inspection of both scrotal size and shape should be done in a warm environment on a relaxed bull, since under these circumstances the scrotum will be maximally pendulous [46]. In order to provide sufficient thermoregulation, a distinct scrotal neck free of fatty deposits should be present. Straight-sided and wedge-shaped scrotums, as well as normal scrota with fatty deposits in the scrotal neck are associated with impaired testicular thermoregulation, which can result in abnormal sperm production. After the visual inspection, scrotal, testicular, and epididymal palpation should be performed. The thickness of the scrotal wall and the fat content of the scrotal neck should be assessed, and the testicular cords should be checked for the presence of fat, abscesses, varicoceles or viscera in case of a scrotal hernia [72].

Scrotal circumference measurement: The scrotal circumference (SC) has been extensively used in breeding soundness examinations to determine the semen production ability of bulls [71]. It can measured by scrotal circumference measurement Tapes. Sperm production potential of bulls is directly related to the scrotal circumference (SC), testicular volume (TV), testicular weight (TW) and shape of the testis [4]. A larger than average SC measurement has typically been related to greater testicular mass and volume, and to higher sperm production whereas a small SC often associated with small testis, has been related to infertility [19]. Bulls with smaller than average SC and longer testis, may have a larger TV or TM than bulls with higher SC and shorter testis. Hence, combination of SC with TL and TW would give fairly reliable picture of TV and TM. SC is highly heritable and provides an indirect measurement of testicular weight and size, which are highly correlated to the sperm output [70]. Measuring scrotal circumference is particularly important in the examination of yearling bulls, since it is a good indicator of whether the animal is pubertal [15].

Table 1. Minimum scrotal circumference (in cm) in bulls relative to the bull's age.

Age (months)	Minimum scrotal circumference (cm)
> 12 - 15	30
> 15 - 18	31
> 18 - 21	32
> 21 - 24	33
> 24	34

Source; [24 and 43]

2.3.2. Evaluation of the Libido and Serving Capacity

Libido is defined as sexual desire, while serving capacity is the ability to complete the act of mating [23]. A serving and mating ability test requires observation of the bull repeatedly attempt to mount and serve restrained females [39]. To evaluate libido and serving capacity, observing natural breeding is the most efficient but very time consuming. Hence, pasture and corral trials with restrained or unrestrained, estrual and non estrual females, where bulls are tested either individually or group wise for different periods of time [62]. In a 20-minute test, a serving capacity of 0 to 1 is considered low, 2 to 3 is medium, and 4 or more services are considered to indicate high serving capacity. When large numbers of bulls need to be tested, and only bulls of low serving capacity will be culled, bulls that serve a cow twice within the first few minutes can be removed immediately, to conserve the mount cows and speed up the testing process [12].

2.3.3. Semen Collection and Evaluation

2.3.3.1. Semen Collection Methods

Semen collection has been considered like harvesting any other farm crop since effective harvest of semen involves obtaining the maximum number of sperm of highest possible quality in each ejaculate to make maximum use of sires. This involves proper semen collection procedures used on males that are sexually stimulated and prepared. The initial quality of semen has been determined by the male and cannot be improved even with superior handling and processing methods. However, semen quality can be lowered by improper collection and the processing techniques [10].

Artificial vagina: Bulls can be collected very successfully using an artificial vagina but this method requires training for the bull plus collection animals, equipment and experience that most operators do not have. Collection of semen by using an artificial vagina (AV) is routinely used worldwide and considered the optimal way to get a normal and representative semen sample. Thus, using an AV is by far the most common method to collect semen in dairy bulls, as well as in beef bulls used for AI. However, BBSE of beef bulls are often performed under field conditions on untrained bulls, which make semen collection with AV very difficult [59].

The artificial vagina is the method of collection that is closest to the natural condition and is assumed to yield the most normal ejaculate of all methods used. The artificial vagina is basically the same for all males. It consists of an outer rigid or semirigid support with inner jacket containing controlled temperature water and pressure and a collecting funnel and container [69]. The temperature inside the vagina should be 45-50 degrees Centigrade at the time of semen collection. Many bulls will mount, but fail to serve the artificial vagina if its temperature is too cool. If too hot, semen may be damaged or the penis may be burned. Collection of semen via the artificial vagina is the main method of collection in most bull studs. For most bulls, the mount cow need not be in estrus but merely restrained in a head catch [5].

Electroejaculation: The method most commonly used for bull semen collection during breeding soundness evaluations throughout the world is electro-ejaculation [27]. Electroejaculation (EEJ) is, when

performed by a skilled veterinarian, a procedure most likely to result in a semen sample suitable for examination in more than 95% of the bulls [54]. In many countries electroejaculation is routinely used when conducting BBSE since it is considered to be a quick, safe and reliable procedure. However, welfare considerations, due to stress or pain of EEJ, are becoming more important in many countries that use EEJ and it is prohibited on un-anaesthetized animals in some countries. Hence, alternative methods of semen collection are needed. While some concern has been expressed about animal discomfort associated with electroejaculation, newer equipment and an experienced operator make the process relatively stress free [33; 57; 28]. Electroejaculation is used for young bull, whereas artificial vagina is utilized in trained bulls. Low voltage, low amperage current is passed to nerve centers responsible for ejaculation by a rectal probe. The electro- ejaculator having the probe connected with electric supply provides rhythmic pulsation on accessory gland to ejaculate the semen. This method requires no training for the bull and no other animals need be present [47].

Transrectal massage: Rectal massage for semen collection is successful about 80% of the time and is more successful in the younger bull. Transrectal massage (TM) directed specifically towards the ampullary region of the ductus deferens has been shown very effective for producing semen emission and semen samples [61]. Most bulls do not object vigorously to this collection method and prior training of the bulls is unnecessary. Hence, semen collection by TM might be a suitable method to use under field conditions by veterinary practitioners where other semen collection methods are less suitable [75]. Generally the collection method is the owner's preference. However, the manipulation of the AV and electroejaculator causes an increase in accessory gland fluid.

Semen Evaluation: Semen may be evaluated in bulls as part of the routine breeding soundness evaluation, for investigation of fertility problems and for use in A.I [22]. Various procedures are being used for semen evaluation like mass activity, volume, colour, sperm concentration, consistency, individual motility, sperm viability, sperm abnormalities and sperm membrane integrity tests. But there lacks a uniform protocol for standardizing the quality of semen samples produced from different laboratories all over the world, as in the case of WHO guidelines for human semen evaluation [73]. The semen parameters that are routinely examined using standard optical microscopy are the concentration, the percentage of motile spermatozoa and their morphology [58 and 63]. If the bull is satisfactory on general physical exam and the complete

exam of internal and external reproductive organs, a semen sample is collected and evaluated microscopically and under the microscope for the following traits [53].

2.3.3.2. Physical Characteristics of Semen (Macroscopic Test)

Once collected, the semen sample is first evaluated for volume, color, odor, PH and debris [26]. *Color and odor*: Colour is not necessarily a criterion of good quality but gives a check during collection. It can be an evidence of injury or pathology in the tract. It has been known that the bull semen which is concentrated has creamy, milky or creamy white and opaque color. On the other hand, semen with few spermatozoa and that from animal with reproductive system infections has been reported respectively to be translucent and curdy in appearance. Normal bull semen has very little odor. All semen had seminal/egg yolk odor [36]. However, the semen should be free from hair, dirt, urine, blood, faces and other contaminants [65; 35; 9].

Volume: The volume of the ejaculate is readily measured by collecting the sample directly into a graduated vial or by weighing the tubes after semen collection on top-loading balance, and later converting the reading into milliliter by using a computer program, the latter has been known to reduce error associated with visual reading of the tube specially when small volume or bubbles are found by 10 % [9]. The volume has been reported to decline when young bulls are used or when there is frequent ejaculation or incomplete or failure of ejaculation and in bilateral seminal vesiculitis. In summary a number of factors like method of collection, and the sexual preparation of the bull have been known to affect semen volume. The normal volume of semen of the bull has been known to be within the range of 5 to 8 ml per ejaculate. However, a bull with less than 2ml of semen per ejaculate is not acceptable [35].

PH: PH is the measure of acidity (lower values) or alkalinity (higher values) of a given sample. According to, optimum pH common to most domestic species (including bulls) within which spermatozoa performed at its best and has the potential to neutralize vaginal acid ranges between 6.4 to 7.4. PH outside this range tends to lower spermatozoa motility and a low pH reported to immobilize spermatozoa [1]. The pH of semen has been reported to be measured by pH paper or a Ph meter. The pH of bull semen is slightly acidic, about 6.7, and has been reported to rise (≥7) when there is incomplete ejaculation, excessive use of

the bull or in yearling bulls and in pathologic situation of the testis, epididymis, ampulla or seminal vesicle. Dense semen samples which possess excellent motility have been known to show lower values of pH [65; 3].

2.3.3.3. Mass and Individual Motility

It is preferred that mass (gross) motility and individual progressive motility be performed as soon after collection as possible. This is to reduce the affect of cold shock, urine contamination, or other spermicidal contaminants. Mass motility is the collective movement of spermatozoa. Motility of spermatozoa has been defined as the percentage of sperm cells that are motile under their own power and progressive motility of spermatozoa has been defined as those spermatozoa that are moving or progressing from one point to another in a more or less straight line [9]. The mass activity is evaluated by putting a drop of semen onto a slide without cover slip under low magnification 100X. A rapid wave motion with formation of eddies at the end of waves indicate a good quality of semen [77]. The individual sperm motility is evaluated by taking small drops of semen onto a slide with cover slip under high magnification 200X [11]. Sperm cells moving in a straight-line forward direction are considered in the motility measure. All bulls that have unsatisfactory motility are collected at least one additional time, to insure that technique is not an issue. The bull must have a minimum of 30% progressive motility or fair gross motility to be classified as a satisfactory potential breeder [2].

Table 2. Minimum Recommended Motility is: 30% or Fair.

Mass Activity (Gross)	Rating	Individual
Rapid Swirling	Very Good	≥ 70%
Slower Swirling	Good	50 - 69%
Generalized Oscillation	Fair	30 - 49%
Sporadic Oscillation	Poor	< 30%

Source; [43; 51]

2.3.3.4. Sperm Concentration and Sperm Count

Spermatozoa concentration refers to the number of spermatozoa per milliliter of semen [68]. The sperm concentration of fertile bulls range from 3 x10 ^{5} to 3 x 10 ^{6} /mm^{3}, and low sperm concentration has been known to be the feature of testicular hypoplasia and degeneration [3]. However, concentration can also be more accurately determined by means of a counting chamber, e.g. Hemocytometer, it has often been referred to as the "gold standard" for assessing sperm numbers [25; 49; 64].

Concentration is generally estimated by evaluating the colour, opacity and viscosity of the sample. The sperm count has been known to be the total number of the spermatozoa in the ejaculate, and is calculated by multiplying the spermatozoa concentration of the semen by the volume of the ejaculate. Semen collected with an electroejaculator has been known to have a lower concentration of spermatozoa than that collected with an artificial vagina, mainly due to excess accessory gland secretion in the former case. In many infertile or sterile bulls, a rapid decline in sperm concentration between first, second and third successive ejaculates has been known which indicates poor spermatozoa reserves and reduced sperm cell production. The concentration of spermatozoa has been reported to vary with sexual development and maturity of the bull, with feeding regimen, and with reproductive health of the testes [65; 67].

2.3.3.5. Sperm Morphology

Morphological examination determines of the overall structure of the sperm, evaluating the size and shape of the head, mid-piece, and the tail [66]. Sperm morphology is the most reliable criterion to qualify an ejaculate, since it is least influenced by the collection process and since no other sperm criterion is more closely related to fertility than morphology [34]. Morphology is done immediately after collection, between bulls, or after all bulls have been processed, depending on the number of bulls to be tested, and the presence of a second veterinarian. It provides ample evidence that an adequate BBSE cannot be performed without assessing sperm morphology [17]. Morphology can be assessed using different techniques, but supra-vital staining procedures such as eosin-nigrosin staining are commonly used and allow both a morphology differentiation and a live-dead assessment. This live-dead assessment is based on the physical intactness (i.e. structural integrity) of the membranes, only allowing the stain to penetrate the

damaged sperm cells, resulting in both eosin penetrated (dead) and unstained (live) spermatozoa. To this purpose, a drop of semen is mixed with a few drops of stain with a glass slide on another glass slide, after which a smear of this mixture is prepared by dragging the first glass slide at a 30 – 40 ° angle across a slide. Then, the eosin-nigrosin stained smears are air-dried and assessed under a 1000 x light microscope, using immersion oil [8]. At least 100 spermatozoa should be evaluated for the live-dead assessment and the morphology evaluation [50].

Classification of Sperm Abnormalities: Abnormal sperm cells are classified as primary abnormalities such as, underdeveloped forms, double forms, acrosome defects, narrow heads, pearshaped heads, abnormal contour, small and free abnormal heads, abnormal midpieces, proximal droplets and folded or coiled tails, which are of testicular origin during spermatogenesis. Secondary abnormalities such as, small normal heads, giant or short broad heads, free normal heads, detached or folded or loose acrosomal membranes, simple bent tails and terminally coiled tails, which are considered to originate after the sperm cells have left the testis or within the epididymis. Primary abnormalities are given first priority in classification. At least 70% of the spermatozoa should have a normal morphology [43].

2.3.3.6. Assessment of the Plasma Membrane Status

The functional integrity of sperm membranes can be assessed using a variety of systems. An indirect method is to use supra-vital stains which rely on plasma membrane damage to stain underlying structures [50]. The hypotonic swelling test (HOST) relies on the physiological phenomenon that membrane-intact sperm will swell when placed into a moderately hypoosmotic environment, whereas membrane-damaged sperm do not. The induced swelling produces a characteristic coiling of the flagellum inside the swollen membrane which is easily observed under light microscopy at 400 × magnifications. At least 300 spermatozoa per slide were observed. The spermatozoa were classified as either positive or negative based on the presence or absence of coiled tail [45].

2.3.3.7. Computer Assisted Semen Analysis

Computer assisted semen analysis is a sophisticated electronic imaging system to visualize the sperm and an advanced software program to evaluate dozens of individual sperm parameters [76]. The semen specimen is placed on the stage of the microscope. This microscope has a high resolution video camera attached. The video camera feeds data into the computer where it undergoes analysis by software. A computerized semen analysis will give many more parameters that are useful to the fertility specialist. More importantly, the results are accurate and reproducible. Any technician in the laboratory can click the mouse on the computer and get the same results as any other technician. Hence, sperm motility and sperm morphology can be observed [30].

2.4. Examination for the Venereal Diseases

The common reproductive disease concerns are the contagious, venereal, post-breeding diseases trichomonas and campylobacter (vibriosis). *Tritrichomonas foetus*: Protozoa, very sensitive to environmental conditions and found only in the genital tract of the bull or cow. Trichomoniasis is a substantial cause of fetal wastage resulting in economic losses in natural breeding systems. Infected bulls are usually asymptomatic carriers of *Tritrichomonas foetus* (*T. foetus*) but are capable of transmitting the organism to a cow or heifer during coitus. Infections in cows and heifers may result in early embryonic death, abortion, pyometra, fetal maceration, or infertility, negatively impacting the economic success of a cattle operation [14].

Campylobacter fetus venerealis (vibrio): Bacteria, sensitive to heat, light and drying, but may survive in manure or hay for up to 3 weeks and found generally, only in the genital tract of the bull or cow. It is characterised by infertility, early embryonic death, and abortion in cattle [44].

Sampling Technique: The bull is restrained to prevent injury (to the bull or personnel). The external preputial area is cleaned a pipette is introduced into the fornix of the bull's prepuce (10 - 12 inches). Smegma is collected by a combination of scraping and aspiration using an attached disposable syringe. The smegma immediately placed into culture media. The culture media used is specifically prepared for

growing either the T. fetus or Campylobacter. The tip of the pipette is inserted into the liquid media and inoculated (~0.5 cc). The sample is placed in an insulated container until it reaches the lab. At the laboratory the samples are incubated at 37 degrees Centigrade. Samples are read under a microscope on three occasions after inoculation: 24, 48, and 96 to 120 hours. Test positive bulls should be culled immediately. A test negative bull from a herd with no previous history of disease has a high likelihood of being negative. Further testing may be necessary to confirm a negative state [74].

2.5. Breeding Soundness Examination Outcomes

The final step of the BSE is to place bulls into one of three categories: Satisfactory bulls which equal or surpass minimum thresholds for scrotal circumference, sperm motility and sperm morphology, and which do not show genetic, infectious or other problems or faults which could compromise breeding or fertility [24]. Unsatisfactory bulls which are below one or more thresholds and which are highly unlikely to ever improve their status. Also, bulls which show genetic faults or irrevocable physical problems (including infectious disease) which would compromise breeding or fertility are included [29]. Deferred any bull which does not fit into the above categories and which could benefit from a retest. Provision is provided for the scheduling of a retest. This category includes young bulls with an "immature" semen profile as well as any bulls whose semen is substandard but considered to be capable of improvement. Also bulls from which a representative ejaculate was not obtained, as well as bulls with treatable problems. In general, if doubt exists concerning a bull's status, he should be considered as a candidate for a retest and placed into the "classification deferred" category [7].

2.6. Limitations of Breeding Soundness Examination

Limitations of the BSE include: Results are most valid at the time of examination only, the system works best to identify infertile bulls, it is not designed to predict the precise fertility of individual bulls, it does not routinely include assessment of bull libido and mating ability, and it does not routinely include testing for infertility diseases [20].

2.7. Relation of Breeding Soundness Examination to Infertility

Infertility in the bull would be present when the bull is incapable in impregnating cows but he could improve with time or treatment. For example, before reaching puberty all bulls are infertile. Sterile bulls cannot impregnate cows at all and cannot conceivably regain their fertility. A bull with a birth defect where both epididymis are missing would be sterile. Venearal diseases can also cause infertility. The majority of problem bulls are subfertile. The BSE is to identify and eliminate unsound breeders rather than to make a prognosis on fertility. Hence, BSE when done well it reduce the probability that using infertility bull, but when the breeding soundness examination is not done well the probability to use infertility bull will be increase. Due to the sperm of infertility bull is poor it can also not pregnant the cow [71].

3. CONCLUSION AND RECOMMENDATIONS

Breeding soundness evaluation is a series of tests to identify bulls that have potential for satisfactory fertility. It is to establish baselines, or thresholds, above which bulls would be regarded as satisfactory potential breeders. It is used for indication and elimination of sub fertile and sterile animals. Also it can increase the pregnancy rate of the cow. The process has some Limitations which include: Results are most valid at the time of examination only, it does not routinely include assessment of bull libido and mating ability, and it does not routinely include testing for infertility diseases.

In line with the above conclusion, the following recommendations are forwarded:

- Special attention should be given to breeding soundness evaluation of bulls to reduce or eliminate sub fertile and sterile animals.
- Routinely assessment of libido and testing for infertility diseases should be included in BSE since these will negatively influence semen quality.
- Bull should be always screen prior to their use, since results are most valid at the time of examination only.
- Giving awareness's to the farmers the importance of breeding soundness examination to increase the pregnancy rate of their cows.

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