GUEST EDITORIAL

The Saga of Artificial Insemination

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Introduction

Preamble:

The Veterinary School at Sokoto University has decided to establish a veterinary journal. I believe that the main objective of this proposal is to disseminate relevant animal husbandry information to the citizens of Sokoto State, and to Nigerians at large. Furthermore, I believe that the intention is to stimulate innovations in veterinary medicine and impact changes on the university community. The editors and the editorial board as a whole, need to realize that effectiveness of such a gigantic endeavour ("making of a journal") is rooted in its vitality, its ability to extend above a mere ability to endure over time, and thus, to create and/or react to significant environmental changes. I am sure that the faculty at Sokoto is willing to sacrifice the time and resources to make this conception a reality. I strongly propose involvement of the university community in achieving the objectives of the veterinary school at Sokoto University. I pride myself as an alumni of the Nigerian veterinary profession and I pledge my support of the Sokoto Veterinary Journal. I believe that I could make an impact by contributing to the maiden journal; and I wish to do this by giving a summary of the diseases that could adversely influence the success of the artificial insemination program in Nigeria.

Overview:

Artificial insemination was initially set up to distribute and spread out advantageous genes and eliminate the problem of venereally transmitted diseases. Unfortunately this intention has been met with some inevitable disadvantages with possible spread of diseases, vis a vis the required genetic traits. With the ability of studs to give several doses of semen from a single ejaculate, and widespread distribution of frozen semen nationally and internationally, the potential for the spread of venereal diseases and undesirable genetic traits and defects is considerably greater than one could envision. Caution is needed to avoid the spread of diseases as well as the spread of genetic defects, considering that freezing of semen and cryoprotectants enable many pathogens to survive and be transmitted through insemination to recipient females (Batlett, 1981). Despite rigid protocol in artificial insemination centers,diseases still pose considerable semen-borne problems. Of significance to the livestock industry in Nigeria and parts of Africa are the following diseases:

A. CATTLE

Foot-and-mouth disease

The FMD virus is readily transmitted in semen (Cottral et al, 1968) and presents a real risk for transmission by AI in Nigeria, where there is still little new work done on FMD in relation to AI. In the infected donor stud, semen

quality could deteriorate at the height of the FMD-induced fever, and there will be very little or no virus in the semen when the quality recovers. However, convalescent bulls could retain the virus in the pharynx for several months, which might be a source of infection to naïve stock. Furthermore if in immune-compromise bull, or even a protected bull is exposed to the homologous or heterologous type of field virus, it could temporarily shed the virus from the skin of the prepuce, leading to seminal contamination. Donaldson and Sellers (1983) recommended the following guidelines to curb semen-borne FMD virus transmission via AI:

a) Adequate period – 30 days – following vaccination before semen collection to ensure that the vaccine contains no live virus.
b) A probang sample from the donor bull or boar at the time of collection, and a confirmation that no clinical signs of the disease have occurred in the stud for the subsequent 30 days.
c) Samples of ejaculates are cultured for virus and confirmed negative before semen is distributed or inseminated. A confirmed declaration of freedom from the disease at least 3 months before semen collection, and at least I month after collection, is necessary under all circumstances. Where vaccination is not practised, confirmation from the disease in a specific in a area and a suitable quarantine period of storage may be satisfactory.

Infectious Bovine Rhinotracheitis IBR

The bovine herpes virus type I (BHV-I) is the most common herpes virus found in bull semen. This may lead to clinical signs in inseminated cows or heifers, short estrus intervals in unprotected females; sero-conversion and retention of the virus for life (Parsonson & Snowdon, 1975). Of economic significance are bulls that are negative to stud tests at a year old, but later sero-convert and excrete the virus. Several approaches have been taken to contain the IBR virus in areas where the disease is endemic;

i) both virus and inactivated vaccines have been used to promote immunity and reduce sheddding of the virus in carrier animals.
ii) better husbandry system aimed at improving general health of livestock; note that viral excretion from asymptomatic carrier bulls in semen is intermittent and could be influenced by stress, extraneous transportation, debilitating diseases etc.
iii) application of reliable diagnostic tests to eliminate carriers from the herd. New approaches have been developed to deal with identification and elimination of carrier studs. A journey through the Internet will take you to useful information highway.
iv) more workshops need be organized on semen-borne viral diseases to update the knowledge of livestock personnel.

Rinderpest

The rinderpest virus is known to be excreted in semen during the acute disease, but there is no known carrier state reported. Tissue culture vaccines are recommended over traditional goat attenuated products, but country freedom from the disease is usually mandatory. Studs from rinderpest localities must be vaccinated and quarantined prior to

semen collection for artificial insemination.

Bovine virus diarrhoea

A transitory mild infection with the non-cytopathic biotype and results in brief viremia associated with seroconversion. The virus has been seen in the semen of seronegative immunotolerant bulls in AI centers. This demonstrates the existence of the virus in the semen. The virus could be shed in the semen at peak of viremia; and results in early embryonic death, repeat-breeding and reduced conception rate, in inseminated heifers. Because of the ubiquitous nature of the non-cytopathogenic virus, majority of stud bulls could be seropositive, but persistently infected animals are usually seronegative. For this reason, it is important that sensitive diagnostic tests be used to identify and eliminate carrier studs. Flourescent antibody techniques (FAT) and semi-automated immunoperoxidase staining techniques are among the diagnostic tools regularly used. It is recommended that regular screening be carried out of all potential AI sires for the virus in the blood. In Nigeria and other nations where diagnostic tools are not readily available, vaccination of all young bulls with BVD virus could be of economic significance. This suggestion, if acceptable, could be viewed with caution. It is known that live vaccines may be immuno-suppressive; killed vaccines are preferable; and recombinant vaccines may yet prove to be more selective.

Vesicular stomatitis

The virus is most likely to be present in semen during the course of the disease; but there is no information on excretion in those animals protected by attenuated live virus vaccines. Most countries demand area freedom from the disease prior to acceptance of studs.

Bluetongue

The disease is widespread, and is well known to Nigeria and other African countries. Cattle are not the primary hosts for bluetongue; transmission is by Culicoides midges, which leads to a prolonged viremia of up to 100 days. During this viremic phase the virus is shed in the semen, although the condition may be asymptomatic. The mechanism of sheding of the virus in semen is controversial, but there is clear evidence that bluetongue disease may be transmitted by bluetongue-contaminated semen. Diagnostic tests are therefore a necessity, for identification and elimination of contaminated semen. Well reviewed diagnostic tests include: specific ELISA tests; specific Serum Neutralization test (SNT); in vitro virus isolation tests; diagnostic senostic sensitvity and specificity of genetic probes for detection of bluetongue virus in semen. It is recommended that:

a) It is clinically and economically important to maintain stud bulls serologically negative for bluetongue where artificial insemination is to be widely practised nation-wide.
b) Young sires should be moved out of endemic regions before passive immunity is lost at 6 months of age.
c) Bulls should enter AI centers and semen should be collected at the Center when the flies are not active.
d) Possibly, AI bulls should be housed, since housing is said to curtail fly challenge considerably.

Brucellosis

The saga of brucellosis in livestock

is well known and perhaps well studied and understood in Nigeria in all fabrics of life. It has been of a major economic cancer in the livestock industry in many localities in most of the States. Nigerian veterinarians and livestock personnel are very knowledgeable when it comes to the clinical history and recognition of the disease. It is established that the brucella organism is shed in the semen and could be transmitted via the semen. There is therefore, a possible merit in a semen plasma test in areas of high risk.

Other Potential Semen-borne Diseases

These could be of some limited economic significance to the Nigerian livestock industry:

Lumpy skin disease
Tuberculosis-
Campylobacter fetus venerealis
Hemophilus somnus
Mycoplasmosis

B. SHEEP

General disease conditions that could be semen-borne and therefore of AI significance in Nigeria include: rinderpest; FMD; bluetongue; brucellosis; Johnes disease; leptospirosis. These conditions deserve attention in a similar way to that of the cattle outlined above. However, AI in the sheep and small ruminants in general, has not attained any sizeable economic significance in Nigeria. But I am of the opinion that AI in the small ruminants should not be relegated to the background. In terms of fecundity and prolificacy, this aspect of the livestock industry in Nigeria could produce a bigger economic yield, if given due consideration. Emphasis should be on general disease control and effective semen processing to yield disease-free semen for AI.

In conclusion I suggest that:

(a) Attention should be given to understanding the pathogenesis of semen-borne diseases that are of significance to Nigeria and neighboring countries.
(b) Updating knowledge of diagnostic techniques to achieve greater precision in confirming the presence or absence of microorganisms in semen from AI sires.
(c) There should be no room for complacency, especially with regard to endemic diseases in the animal population in Nigeria.
(d) The general health of the livestock in Nigeria should be of paramount importance
(e) Regular screening and vaccination against endemic semen-borne diseases like FMD, rinderpest, brucellosis, IBR etc.
(f) Routine quarantine of sires until declared free from common semen-borne diseases.

The Nigerian Veterinary Medical Council could establish approved standards of semen collection, processing and AI protocols; and certify AI insemination technicians. In addition, periodic workshops could be organized to update personnel on current AI management. The burden of proof and success rest on the local chapter (in Sokoto) of the Veterinary Medical Association.

Referenes

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