

INTERNATIONAL ANIMAL HEALTH NEWS



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Reproduction in Water Buffalo

By Bruce M. Olcott DVM, MS, MBA and Donya Olcott, DVM

Introduction

The term "water buffalo" brings to mind visions of brave hunters armed with high power rifles stalking a killer buffalo. These animals are Cape buffalos (*Syncerus caffer*) and reside in Africa. They are indeed dangerous animals and are guilty of killing humans and even lions. It is said that Cape buffalos have killed more humans in Africa than any other African animal. A domestic water buffalo, on the other hand, is more like Jersey cow than it is a fierce Cape buffalo. Today, there are more than 168 million water buffalo existing all over the world (with the exception of sub-Saharan Africa) with large herds in Italy, Bulgaria and Australia. They are domestic animals and have been for the last

2,600 years. Often, they are treated like members of the family and cared for by women and children in countries of the developing world.



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There are actually two types of water buffalo. The Swamp buffalo (*Bubalus carabanesis*, 48 chromosomes) is the draft animal of choice in the rice fields of eastern Asia. They are managed similarly to beef cows in the U.S. The River buffalo (*Bubalus bubalis*, 50 chromosomes) is used for dairy purposes throughout India and other parts of the world. River buffalo make up 65% of the world's buffalo population and account for 92% of buffalo milk produced. In addition to the two types of water buffalo, there are several distinct breeds of River buffalo (18 River buffalo breeds in India). Each breed has its own identifiable traits. Swamp buffalo, on the other hand, are considered to all be of the same breed.

Although their chromosome numbers are different, Swamp buffalo and River buffalo have been known to cross breed. Some of their offspring are infertile but fertile hybrids are also produced. These cross breeds exhibit high levels of hybrid vigor with offspring having a 40% more rapid growth rate and 4-% more milk production than their parents. Water buffalo cannot cross breed with domestic cattle (*Bos Taurus*).

Clearly, water buffalo play an essential role in the developing world and will continue to do so. India is home to 91 million buffalo or 56% of the world's population. Also, between 1961 and 2001 the world buffalo population increased by 91%.

Utilization

Buffalo are important for milk production, particularly in Asia. In India, buffalos make up 40% of the milking bovine stock but produce 56% of the total milk. That's right; buffalo produce more milk than cattle! Indian buffalo produce an average of 1041 kg of milk per year and Indian cattle only produce 631 kg of milk per year. Water buffalo produce milk that is higher in butter fat, protein, and minerals than cow's milk. Because of its higher quality, the value of buffalo milk in India is 30% higher than that of cow milk. In Italy, buffalo are so highly prized that, by law, mozzarella cheese can be made only from their milk.

Some buffalo can live off of high fiber forages on which cows would do poorly. They also utilize

non-urea nitrogen sources better than cattle, meaning that they can be fed rations composed of straw bran and urea. Buffalo make excellent draft animals for wet environments. They usually represent a "piggy bank" investment for the family, as their value increases as their size increases.

Reproductive Potential

Water buffalo have long been considered poor breeders. They are slow to mature and slow to rebreed after calving. However, water buffalo are generally poorly fed, used as draft animals, and expected to produce milk and then breed back in a timely fashion. Because of this, we often unfairly compare cows to buffalos and disparage their production when cows kept in the same way as buffalo are actually less productive than the buffalo. Also, buffalo reach sexually maturity relatively late, have a gestation period that is about a month longer than that of cows, are difficult to detect in estrus, and almost always mate at night. Given these facts, it is very possible that the "shortcomings" of the animals are a mere function of their environment and our lack of knowledge than a true problem with the animal itself.

Female

Puberty: Water buffalo reach puberty at a later age than cattle. In general, bodyweight makes a better criterion for puberty and enrollment in breeding programs than does age. River buffalo exhibit their first estrus at 15- 18 months and Swamp buffalo do not exhibit estrus until 21-24 months. First conception usually occurs at 24-36 months of age at a body weight of 250-270 kg. Under conditions of improved nutrition and cool ambient temperatures water buffalo will perform even better than these figures.

Estrus cycle: Buffalos are similar to cattle in their estrus cycle. Estrus usually lasts about 24 hours with a range of 11- 72 hours. On average, the estrus cycle lasts 21 days just like in a cow. However, the range is very broad and can be 9- 35 days in length. Cyclical changes in the ovary of buffalo are not the same as those which occur in a cow. However, both water buffalo and cows respond to prostaglandin with luteolysis.



Estrus: Less than 33% of Water buffalo estrus cycles are detected. The rest are classified as silent. The most reliable sign of estrus is frequent urination. Buffalo cows will urinate small quantities every 4-5 minutes in some cases. Homosexual behavior is unusual. When mucus discharge is present, it will be clear in early estrus and become cloudy in late estrus. Most estrus occurs at night, between dusk and dawn. Night heat check pens have been used with great success. Similar techniques have been used on water buffalos as we use on cows to improve heat detection: teaser bulls, mucus discharge, rectal palpation, and tail-head chalk or heat patches. While these methods increase the level of estrus detection, they have little effect on conception rates. Gestational estrus is shown in 6-18% of water buffalo.

Gestation: Conception rates of 50- 60% are average for natural service and AI rates are about 25-30%. Pregnancy occurs much more commonly in the right horn than in the left. Pregnancy palpation can be performed at 6 weeks of gestation and a pregnancy diagnosis is based on palpating a fetus, caruncles, or distended uterine arteries as is done in cattle. Gestation is roughly one month longer in buffalo than in cattle and is more variable in length. Buffalo average 310 days (10 months and 10 days) with a range of 300-334 days.

Parturition: The signs and sequence of parturition are very similar to those of cattle. Impending signs of parturition include distention of the mammary gland, swelling of the vulva, and the relaxation of the ligaments of the pelvis. Dilation of the cervix lasts 1-2 hours and the second stage of labor with rupture of the amnion lasts 30-60 minutes. The placenta is expelled in 4-5 hours. Twinning is rare with a rate of 1 per 1000 births.

Post Partum Period: Resumption of the estrous cycle post partum is a major problem in water buffalo. Very often, buffalo experience delayed returns to estrus, long days open, and extended calving intervals. Factors that negatively affect return to estrus include: low BCS, suckling a calf, poor nutrition, and hot humid weather. In general, River buffalo have better reproductive performance

than do Swamp buffalo. This is partly breed dependant and partly due to the fact that River buffalo are usually managed more intensively and do not suckle a calf. River buffalo usually return to estrus in 75 days (35-185) and conceive by day 125 (85-150). Swamp buffalo return to estrus in 90 days (40-275) and conceive by 180 days (40-140). Young females in their first lactation are the slowest to return to estrus and conceive.



Examination of the Reproductive Tract: Buffalo are suspicious of changes in their daily regime and may become aggressive if a rectal examination is attempted. Typically, a tong or wire through the nose is used as a restraint device but is generally not adequate to hold them for sensitive procedures.

The reproductive tract of buffalo is similar to that of cattle with a few notable differences. The cervix is less prominent, the uterine horns are more coiled and the ovaries are more firmly attached to the body wall of the buffalo than in cattle. As in cattle, the uterus has tone during estrus and is flaccid during diestrus. Ovarian findings are similar, but in buffalo, corpora lutea (CL) are smaller and follicles may protrude above the ovary and be mistaken for a CL. In general, palpation of ovarian structures is less accurate than in cattle.

Pathologic conditions diagnosed in rectal examinations include inactive ovaries, follicular or luteal cysts, adhesions and inflammation of ovaries, pyometra, metritis and cervicitis.



Male

Puberty: Testicles are occasionally present in the scrotum at birth but usually do not descend until 2-4 months of age. The testicles are quiescent until 7-8 months of age, at which time the testicles grow rapidly and produce testosterone. Spermatogenesis begins at 12-15 months of age but viable semen is not present in ejaculates until the bull is 24 months of age.

Genitalia: The testes, accessory glands, and penis of the buffalo are similar to those of cattle. However, the testes and scrotum are smaller in buffalo. The size of the testicles is related to the number of semen per ejaculate. The spermatogenic cycle for buffalo is extremely short and lasts only 38 days.

Semen: The ejaculate is grayish to milky white and rarely exceeds 5ml. Concentration of sperm is 300-1500 million cells per milliliter. Normal ejaculates can have 5-20% abnormal spermatozoa. In general, motility is less in buffalo semen than in cattle semen.

Breeding: Serving capacity for breeding soundness certified males is generally 20-30 females for one male. Sexual behavior is similar to that in bulls but is less intense in buffalo. Males sniff the vulva of the female and have a "Flehmen" response prior to mounting. Mounting is brief and only lasts a few seconds. Males suffer a serious loss of libido during the hot season of the year or periods of unusual heat.

(We will be continuing our series on reproductive health in the next issue with "Reproduction in Water Buffalo" part II)

Influenza and its Spread

By Michael Specter

Abstracted from *Nature's Bioterrorist: Is there any way to prevent a deadly avian-flu pandemic?*

Michael Specter, *The New Yorker*, Feb. 28, 2005

Influenza is the sixth-leading cause of death in the United States, and it is responsible for even more damage in less-developed countries.

People—often even doctors—refer casually to any respiratory infection as "the flu," but most are not. Influenza is caused by an orthomyxovirus, which comes in three types, designated A, B, and C. The B and C forms can infect people and make them sick, but they're not common and they're rarely serious. Type A is the virus we worry about. Every influenza virus has hundreds of microscopic spikes rising from its surface. Most are made of a viral protein called hemagglutinin, which can latch onto cells that the virus seeks to enter. The other spikes are called neuraminidase, an enzyme that helps the virus spread. These two proteins are the reason that flu viruses are labeled with the letters "H" and "N." Type A influenza has been so successful for so long because it is among the most mutable of viruses, capable of swapping or altering one or more of its eight genes with those from other strains.

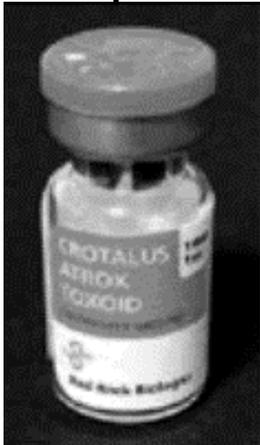
The eight viral flu genes are put together in segments a bit like a line of connected Lego blocks, and they are easily dismantled, changed, and reassembled. When animal strains of influenza mix with human strains, there is always the possibility that the result will be an entirely new virus. That is called "antigenic shift." When large fragments of genetic material are replaced with genes from other influenza subtypes, or with genes from other animals, like pigs or chickens, the outcome is something that the human immune system will be unable to recognize. And, even with the sophisticated tools of molecular genetics, we cannot predict how a virus will change or when or whether it will become more or less dangerous. The elaborate transportation system for a flu virus adds to the chance nature of its evolution. The chances that an animal virus will jump the species barrier are greater in places with constant contact between humans and animals.

Migrating birds may play an important role in the spread of avian viruses and increase the chance of new strains developing. Many epidemics in birds seem to occur in areas with seasonally large populations of migratory birds.



Additional Information

Development of Snakebite Vaccine



It is not our usual practice to discuss a product that is still in the process of being developed. However, when we hear of something with the potential of a snakebite vaccine, it bears mentioning. Although currently only effective in protecting dogs from two species of poisonous snakes, if the concept proves workable, it may be developed for other species and for humans as well.

Vaccinated dogs will still need to be seen by a veterinarian following a snake bite. The advantage of the vaccination lies in its ability to reduce mortality, serious tissue damage, and other problems associated with snake bites.

We will provide new information as it becomes available. The vaccine is produced by Red Rock Biologics (www.redrockbiologics.com)

Christian Veterinary Mission's Educational Materials Update

Christian Veterinary Mission is happy to announce the release of its newest, long-anticipated book "Slaughter and Preservation of Meat" by Dr. Sandol Johnson. It is a unique book with many color illustrations that will help the reader distinguish between normal and diseased or parasitic organs and determine which parts of the slaughtered animal should be removed from the food chain. It also discusses the examination of animals prior to slaughter and includes excellent discussions of sanitation at all levels. Written in simple language, it could be of use in community and farm settings and contains illustrations and instructions for slaughter facilities.

It is the only affordable book of its type and, along with the entire CVM library, is available at no cost to organizations working to help the small farmer in developing nations.

Also in development is "10 Simple Steps to Parasite and Disease Prevention". This booklet was brought about by the request of many who felt that a book of this type was much needed. It covers all of the major methods of disease and parasite prevention that small farmers anywhere can use to help improve the health of their animals at little cost.

Information on all of Christian Veterinary Mission's educational materials can be accessed by writing to Christian Veterinary Mission or at the CVM website: http://www.cvmusa.org/html/education_materials.htm

Readers' Corner

As a new feature, IAHN will present questions submitted by our readers for comment and discussion. We hope that this will not only help other readers experiencing similar problems, but also provide a way for our readers to share their expertise and experience with one another. We encourage your questions and suggestions. Remember, any observation, no matter how basic and common in your area, may not be known elsewhere and could be of great help to others.

Fire Ants

A reader in Sierra Leone writes asking about fire ants in his goat pen. He is worried about the fire ants effect on his goats but also reports that his chickens eat the ants. He has been sprinkling kerosene around the floor of the goat pen, but it has not solved the problem.



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So, the question is do the fire ants damage the chicken that eats them? Our resident poultry veterinary was unfamiliar with fire ants, so we would appreciate the input of readers in areas affected by these insects.

In general, fire ants appear to be a serious problem in tropical, semi-tropical, and most temperate climates of the world. The major problem in eradicating fire ants is that we can fairly easily kill the worker and scout ants, leaving the queen to produce a new generation in a matter of days. Unfortunately, the queen who lays the eggs is safely situated several feet below the surface of the ground.

In order to kill the queen it takes an insecticide-bait combination that the worker ants carry to the queen as food. This specialized combination poison is expensive and often not available in rural areas. And even if the best and most expensive insecticide bait is placed on each mound, it is generally just a matter of a few weeks before mounds in the surrounding areas spread and begin another cycle of the same problem.

We would welcome any comments from our readers suggesting control methods that do not depend on expensive chemicals even if they are very basic home remedies that offer subtle improvement. Perhaps someone has had good results from some physical change in the way that they farm.

Table Scraps

The same reader reports that he buys all of his chicken feed commercially. Because this is so expensive, he has to limit the amount he feeds each bird and they seem to be hungry most of the time.

His question is can he feed table scraps including papaya, oranges, pineapple scraps, etc that would supplement the chicken's frugal diet?

From my own experience in an isolated rural area of the southern United States and in the opinion of a retired poultry veterinarian friend, this would be perfectly acceptable.

Scraps from green vegetables would provide some nutrients and would be an excellent source of vitamins and minerals. In some instances, the scraps might need to be peeled or chopped for easier consumption.

There are a few guidelines for this farmer and anyone raising poultry. Remember, there is always the possibility of the bird (or animal) consuming worm eggs and germs from the soil when food is fed on the ground. So, it is a good idea to use a trough or container to keep the food off the ground.

Another option for supplementing the birds' diet is to allow them to eat insects and earthworms which can be an excellent source of nutrition. If birds are confined, they will soon destroy the vegetation, eliminating earthworms and insects. Instead, allowing the birds to run loose for part of the day is a simple way to let them supplement their own diet.

However, this practice too presents a major problem. Birds left to roam can destroy a vegetable garden in a matter of minutes. Great care must be taken to ensure that the farm and greater community will not suffer if chickens are allowed to run loose.



Information Sources

Other Publications of Interest

There are a number of resources that might be of use and interest to our readers. While all are available by paid subscription, some offer free subscriptions to those working in developing countries. Make your request on an official letterhead and mention that you are from or working in the developing world.

Caraphin News is the newsletter of the Caribbean Animal and Plant health Information Network. It is an excellent publication with a variety of news items, research information, updates on disease outbreaks, notes on meetings of interest, and information on relevant publications. Contact:

IICA
PO Box 705 C
Bridgetown,
Barbados

Footsteps published by Tear Fund, England is another excellent publication. It concentrates more on human medicine, public health, and social issues but covers many topics that would be of interest to our readers. Because of its wide distribution, readers often participate by contributing practical solutions to every day problems. It also contains letters from its readers requesting help on a variety of problems including animal health and production. Each issue lists many new and interesting publications. Contact:

Tearfund,
100 Church Road
Teddington
TW 11 8QE, UK

ECHO News and ECHO Developmental Notes These two publications are from ECHO, a wonderful organization based in Florida. ECHO is engaged in a variety of projects that benefit small, sustainable farms in developing countries, including research on fruits and vegetables, a seed bank where seed can be ordered, and teaching workers from developing countries and individuals planning work in developing countries. ECHO also maintains an extensive library from which books of interest to those working in the developing world can be ordered.

The publication *ECHO News* is a general interest publication with a variety of information that would be of benefit to our readers. Of special interest is their up-to-date information on research on fruits and vegetables that have the potential to greatly improve lives. Their other publication *ECHO Developmental Notes*, which is more technical, can be requested at the same address. Contact:

ECHO
17391 Durrance Road
N. Fort Myers,
Florida, USA 33917-2212



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Featured Web Site – Best Management Practices from PDHGA

Best Management Practices from PDHGA- Through industry sponsorships and cooperation with the Milk and Dairy Beef Quality Assurance Center, the Professional Dairy Heifer Growers Association (PDHGA) has developed more than 100 Best Management Practices that address the fundamental management areas of replacement rearing.

The format includes a series of checklists for growers to follow. A second phase involves evaluation by a third party consultant, such as a veterinarian or extension agent.

For more information on the PDHGA's Best Management Practices and certification program, contact PDGHA at www.pdhga.org or 1-877-HEIFERS.

Calf Notes Website

Calf Notes.com- A rich source for information on raising young dairy calves. Be sure to read the latest ***Calf Notes***, by Jim Quigley, PhD and visit the archives for previous articles. In addition, ***Calving Ease***, by Sam Leadley, PhD will provide an interesting perspective on the latest on calf and heifer rearing. Most material is also available in Spanish, Portuguese, and Japanese

Agricultural Research Website

A monthly publication of The USDA Agriculture Research Service, ***Agriculture Research Magazine*** gives up-to-date reports on a variety of research on all of the agricultural commodities from fruit and vegetable to animals and about everything in between. Mail subscriptions are available and there is an online version at <http://www.ars.usda.gov/is/AR/>

IAHN Editors' Notes:

As a follow up to an article on Johne's Disease (paratuberculosis) in our most recent issue, there was an article in the JAVMA, vol 227 No.8, October 15, 2005 entitled "Effect of Paratuberculosis on Culling, Milk Production, and Milk Quality in Dairy Herds" by S.H. Hendrick et al. It discusses material derived from considerable research on the subject which seems to suggest that paratuberculosis significantly decreases milk production and cow longevity. The article also points out that it is widely accepted that paratuberculosis results in premature culling of infected cattle. Another interesting observation Hendrick makes is that paratubercular status was not associated with milk somatic count linear score.

We always welcome your comments as to how we can make this publication more helpful to you. We welcome suggestions for articles and information sources that might be of benefit to others. We would like copies of articles or other helpful information that you think may be of interest to others.

WE STILL HAVE FREE SUBSCRIPTIONS to this publication. We would prefer that they go to libraries, educational institutions, or other groups who will copy this information for others.

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