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From the Editor's Desk.....

Efforts should become fruitful

Opportunities and threats are a part of life to the people who eke out a living out of livestock. Few Veterinary colleges, limited seats, non availability of veterinary graduates for filling the vacancies can be cited as some of the reasons peculiar to the livestock. Whatever may be the reason, needs and problems continue to haunt the avocation.

To solve the problems, efforts are on and employing retired employees on contract basis, training youth as Gopalamitra, Sanghamitra, Jeevamitra are some measures taken by the Government. The trained personnel are deputed to the areas where Veterinary Hospitals does not exist . This measure serves a twin purpose , one provides employment to the youth and second to offer first aid etc to the dumb animals

On other hand, Animal Husbandry Department is extending facilities like supply of milch animals, fodder seeds and chaff cutters on subsidy, starting mobile Veterinary Clinics for the benefit of farmers.

After that "Ideal farmers' came in the picture. Ideal farmers are meant for providing technical information and advice to the rural farmers. They were given sufficient training in all aspects of dairy and if they work with dedication, they would become a perfect support to the rural mass.

- Editor

WisPREC Spray

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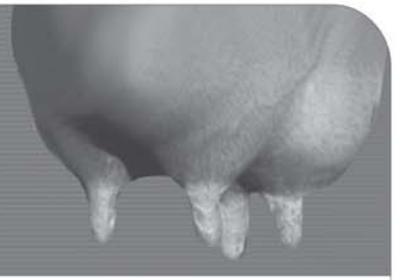

Indications

- In mastitis, as a topical anti-inflammatory along with antibiotic therapy for speedy recovery
- To reduce udder inflammation and pain
- To minimize the bacterial load on udder
- To prevent cross infection and recurrence
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Recommendations

- In optimising ruminal contractions in animals showing ruminal stasis
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- In restoring normal digestive functions after chemical drug treatment

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Geographic information systems (GIS) and Remote Sensing In veterinary science

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Introduction

Geographic information systems (GIS) in general, and Web-based GIS in particular, are changing very rapidly because of the simultaneous increases in and sophistication of software, processing power, data storage capacity and available bandwidth. The spread of globalization, with its consequent impact on trade, information exchange networks and emerging diseases, has meant that the demand for Web-based GIS is exploding. This has been compounded by the comparative speed with which basic sites can now be constructed. An active data site with a GIS element is a must-have for all self-respecting data-rich projects. There is a wide range of issues which should be considered before a GIS website can be launched – its function and appearance, its content and audience, its maintenance and stability and the implementation. There are also issues of technical complexity and data formats, levels of access, confidentiality and accreditation, or quality control and data validation, all of which must be addressed if a site is to be both reliable and effective.

Many important diseases of livestock are affected directly or indirectly by weather and climate. These links may be *spatial*, with climate affecting distribution, *temporal* with weather affecting the timing of an outbreak, or relate to the *intensity* of an outbreak. GIS have already been widely used in sector such as the management of natural resources, agriculture, rural and urban planning. Remotely sensed data can be used to identify, monitor and evaluate environmental factors. Also, GIS can create a link between spatial data and their related descriptive information (Non-spatial data) such as socio-economic and medical data. Both spatial and temporal change in environment condition can be important to determine the diseases emergence and transmission. Recently, GIS and Remote Sensing started to be used to evaluate and model the relationships between environmental factors/indicators and the incidences of disease.

Geographic information system (GIS)

Geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information It is a are powerful computerized systems with capabilities for inputting, storage, mapping, analysis and display of spatial data associated with a location on the earth's surface. Geographical Information Systems have tremendously enhanced ecological Epizootiology, the study of diseases in relation to their ecosystems. It has found increasing application for surveillance and monitoring studies, identification and location of environmental risk factors as well as disease prediction, disease policy planning, prevention and control.

GIS is a database management system for geographic data. A GIS provides a set of powerful tools for studying spatial patterns and their relationships. It allows for the organization of information about a given region as a series of maps where each map (called a layer or coverage) displays information about a specific characteristic of the region or from a specific time period.

Maps or cartography, as used in Epizootiology are important for the following reasons: They display the geographical (spatial) distribution of disease and related factors. They enable one to see at a glance where diseases are present. They are valuable for investigating the mode and direction of transmission of infectious diseases. They suggest possible causes of diseases of unknown etiology. For example the association of jaw tumors of sheep with areas where bracken fern was common, led to the hypotheses that bracken fern causes tumor. This was later supported by experimental investigation.

They facilitate the quantitative display of the

number of cases, populations at risk and prevalence/incidence of diseases.

Spatial data may be represented in a GIS in either vector and/or raster formats. In the vector data format, layers are represented by three basic geometric entities: points, lines, and polygons (Star and Estes, 1990), which represent the location and boundaries of geographic features. The raster (or grid-cell) data format is similar to aerial and satellite imaging technologies, which represents geographic as pixels. Raster data are much better at representing continuous phenomenon such as radiance derived from RS, whereas vectors are better for representing discrete entities such as roads and streams.

Geographical analysis is based on the association between the spatial elements and their attribute data. GIS provides the technology to perform sophisticated analysis that makes use of the links between the two. Queries to a GIS can thus be graphics or data driven. Graphics driven queries involve spatial based searches for objects and retrieval of the associated attribute data. Data driven queries involve the use of data values to display the matching spatial features.

Remote Sensing

Remote Sensing is the science and art of acquiring information (spectral, spatial, temporal) about material objects, area, or phenomenon, without coming into physical contact with the objects, or area, or phenomenon under investigation, furnishing large amounts of spatial and temporal data and the possibility of extracting climatic and ecological information. In remote sensing, information transfer is accomplished by use of electromagnetic radiation (EMR).

In respect to the type of Energy Resources: *Passive Remote Sensing*: Makes use of sensors that detect the reflected or emitted electro-magnetic radiation from natural sources. This systems record environmental energy – light and heat – reflected and emitted, captured by the sensor. The TM (*Thematic Mapper*) sensor from the LANDSAT (*Land Satellites*) series and the HRV (*High Resolution Visible*) sensor from SPOT (*Satellite Pour l'Observation de la Terre*) are examples of passive sensor systems.

Active remote Sensing: Makes use of sensors that detect reflected responses from objects that are irradiated from artificially-generated energy sources, such as radar, the principal advantages of radar are that: it operates both daytime and nighttime; cloud cover does not impede its use; and it detects different textures and slopes.. In respect to Wavelength Regions: Remote Sensing is classified into three types in respect to the wavelength regions *Visible and Reflective Infrared* Remote Sensing, *Thermal Infrared* Remote Sensing and *Microwave* Remote Sensing. Remote sensors act similar to the human eye. They are sensitive to images and patterns of reflected light. A major difference between the human eye and remote sensors is the frequency range of the electromagnetic spectrum that they are sensitive to. The electromagnetic spectrum range varies from very short wavelengths of less than ten trillionths of a meter known as gamma rays, to radio waves with very long wavelengths of several hundred meters. The electromagnetic spectrum (figure 1) can be sliced up into discrete segments of wavelength ranges called bands, also sometimes referred to as a channel.

Applications in Livestock diseases epidemiology:

Geographic information systems have become an important tool in modern animal disease control. Geographical data in digital form is now widely available, but its accessibility is still limited by the high costs involved. It is expected that costs will come down substantially over the next decade with increased use of tools such as Global Positioning Systems and satellite imagery. GIS software is becoming more sophisticated, but still lacks appropriate tools for advanced spatial analysis. In the field of veterinary epidemiology these geographic information systems have been used widely in field research for visual appraisal and to provide data for advanced spatial analyses. Animal disease information systems are being developed which incorporate GIS as a source of various types of spatial data to be used for epidemiological simulations, risk assessment as well as for production of maps.

GIS in animal disease control

The potential applications for GIS in animal disease control range from use in epidemiological field studies and simulation to use in animal disease surveillance. The main two areas of use in epidemiological field studies include the visual display of geographical patterns and spatial analysis. GIS provides digital maps which can then be used in epidemiological simulation to contribute realistic geographical information. In the area of disease surveillance GIS can be used to produce maps of disease occurrence and it can be part of a sophisticated animal disease information system. Reporting and visual display The visual display of spatial phenomena provides a very effective descriptive analytical tool. Pfeiffer (1994) used this method to describe the spatial occurrence of different strains of Mycobacterium bovis in a wild animal population which allowed inferences on the importance of specific disease transmission paths. Lawrence (1991) used GIS to display the distribution of brown ear ticks in southern Africa, retrospectively comparing the ecoclimatic favourability of particular locations for Rhipicephalus appendiculatus with the occurrence of East Coast fever. 7

Epidemiological simulation

GIS can provide geographical data which allows computer simulations of the dynamics of infectious diseases for specific geographical locations. Spatial heterogeneity can be represented in simulation models resulting in more realistic representations of reality. There are only few examples where this 10 approach has been used in veterinary epidemiology. Sanson (1993) described a model of foot-and- mouth disease which represents inter-farm spread of the disease on a true geographical area, using various transmission mechanisms. Pfeiffer (1994) developed a geographic simulation model of the dynamics of bovine tuberculosis infection in wild possum populations. The geographical component is a major feature of this model. The model uses vegetation maps to represent the ecological conditions of particular environments.

GIS in veterinary public health

GIS will find a variety of applications in veterinary public health, particularly for diseases where environment or habitat factors influence disease occurrence. Rabies is one obvious example where the technique has particular application, but there are numerous examples among other diseases in various countries. GIS will mainly be adopted first in research on zoonoses, but will gradually be adopted for disease control. Most of the management applications of GIS will be in form of integrated decision support systems which make field disease control programs more effective, and target them more precisely to control needs.

GIS in study of vector borne diseases

GIS was used to model maps showing the predicted probability of Arbovirus vector activity in Australia on weekly basis. The country was thus divided into two zone of potential viral activity and the reminder of the country considered free of virus activity. Such a map was envisaged to enhance Australia's capability to meet trading partner health certification requirement and ensure a negligible risk of international spread of selected Arbovirus (Cameron 2000). It reported a system designed to assist with the implementation of a predictive tempora-spatial distribution model to forecast the risk of blue tongue virus activity in Australia. An Arc View it was used to combine various data sources (including data from the Australian National Arbor-virus Monitoring Programme), meteorological observations, livestock distributions, vegetation cover and topography.

Remote sensing techniques are used to study a variety of vector-borne diseases. Associations between satellite-derived environmental variables such as temperature, humidity, and land cover type and vector density are used to identify and characterize vector habitats. The convergence of factors such as the availability of multi-temporal satellite data and georeferenced epidemiological data, collaboration between remote sensing scientists and biologists, and the availability of sophisticated, statistical geographic information system and image processing algorithms in a desktop environment creates a fertile research environment. The use of remote sensing techniques to map vector-borne diseases has evolved significantly over the past 25 years. In this paper, we review the status of remote sensing studies of arthropod vector-borne diseases due to mosquitoes, ticks, blackflies, tsetse flies, and

sandflies, which are responsible for the majority of vector-borne diseases in the world. Examples of simple image classification techniques that associate land use and land cover types with vector habitats, as well as complex statistical models that link satellite-derived multi-temporal meteorological observations with vector biology and abundance

Vector-borne viral diseases have been the most important worldwide health problem for many years and still represent a constant and serious risk to a large part of the world's population. GIS in combination with other geographical information technologies (Goodchild, 1992), namely remote sensing and spatial statistics, can be used to analyze and manage vector-borne diseases. We can specifically use GIS and related technologies to identify areas favorable to vectors and assess the risk of this disease to a local population. There are several processes by which climate change might affect disease vectors. First, temperature and moisture frequently impose limits on their distribution. Often, low temperatures are limiting because of high winter mortality and a relatively slow rate of population recovery during warmer seasons. By contrast, high temperatures are limiting because they involve excessive moisture loss. Therefore, cooler regions which were previously too cold for certain vectors may begin to allow them to flourish with climate change. Warmer regions could become even warmer and yet remain permissive for vectors if there is also increased precipitation or humidity. Conversely, these regions may become less conducive to vectors if moisture levels remain unchanged or decrease, with concomitant increase in moisture stress.

Animal disease information systems

Disease information systems are beginning to replace largely manual systems which have been used by decision makers for the control of endemic and epidemic diseases. The large amounts of data which can be processed easily, their objectivity and the quickness of response are some of the advantages of computerized animal disease information systems. GIS provides an essential component of such systems. An example of an animal disease information system is EpiMAN which was developed in New Zealand for the management of an outbreak of foot-and-mouth disease (Morris et al 1992). The system incorporates a database management system, a GIS, a simulation model of foot-and-mouth disease and expert system elements. It allows rapid integration of important information specific to the geographical setting where the emergency is occurring. Geographical data used by the system includes property boundary maps, topography, locations of dairy- and meat-processing plants, sale yards and other animal congregation points, and wild animal distribution maps. Simulated plumes of the air-borne spread of FMD virus can be overlayed over property boundaries using the GIS to identify properties at different levels of risk given certain farm characteristics.

GIS in Poultry diseases

The development of a GIS database of the poultry industry of the Delmarva Peninsula in the United States. This was for the purpose of disease surveillance, outbreak control and emergency management. Knowing the exact location of farms and the nearest road and water works will enhance control efforts by allowing rapid identification of infected farms and others that are at risk due to proximity to infected farms or along transport routes. A GIS database containing farm locations, poultry industry resources, roads, waterways and geographical/architectural features can be used to identify vaccination zones, flock depopulation regions and transport routes that minimize the risk of disease transmission. These are important factors in protecting export market during disease outbreak.

Theileriosis

The Epidemiology of cattle diseases caused by Theileria parva data on selected variables, which influence the Epidemiology of the disease, were assembled and entered into a computerized GIS. Variables studied included the distribution of the major host (cattle and buffalo), the tick vectors (Rhipicephalus appendiculatus and related species), and the reported presence of East Coast Fever, Corridor disease and January disease. In addition, the distribution o f climate suitability of R. appendiculatus was assessed using the model CLIMEX on a climatic database developed for Africa. Distribution maps were produced for each variable i.e. cattle, buffaloes, ticks, eco-climatic index for tick survival and development,

as well as the distribution of mean monthly normalize vegetation index. These buffered maps were then overlaid and points of overlap indicated areas of greatest risk for incidence of Theliorosis. GIS was thus used to portray at a glance the Epizootiological parameters relevant to Theliorosis, and to analyze the complex.

Blue tongue virus disease

Bluetongue (BT) virus causes an infectious, noncontagious disease called bluetongue (Miller and Boorman, 1995). The BT virus (BTV) replicates in all ruminants but severe disease are restricted mainly to certain breeds of sheep and some deer (Taylor, 1986). The BTV is transmitted between its vertebrate hosts by the bites of vector species of *Culicoides* (Diptera: Ceratopogonidae) (Miller *et al*., 2000) and the distribution and intensity of infection are thus dependent on the distribution and abundance of these vectors in space and time. Purse *et al*. (2004) modeled a twenty-year time-series of BT outbreaks in relation to climate. Satellite-derived correlates of low temperatures and high moisture levels increased the number of outbreaks per year. This is the first study to find a temporal relationship between the risk of Culicoides-borne disease and satellite-derived climate variables. Climatic conditions in the year preceding a BT episode, between October and December, coincident with the seasonal peak of vector abundance and outbreak numbers, appeared to be more important than spring or early summer conditions in the same year as the episode. The proportion of variance in the annual BT outbreak time-series resulting from climate factors was relatively low, at around 20%.

Rift Valley Fever

RVF outbreaks are known to follow periods of abnormally high rainfall in Eastern Africa (Linthicum et al., 1983, 1984; Davies et al., 1985). Past studies indicate that periods of above-normal normal rainfall in Equatorial Eastern Africa are associated with warm El Niño/Southern Oscillation (ENSO) events (Ropelewski & Halpert, 1987, 1989). On an interannual scale, periods of above normal rainfall in East Africa are associated with the warm phase of the El Niño/Southern Oscillation (ENSO) phenomenon. Since most of the areas that are affected by RVF have poor and/or sparse coverage by conventional ground climate stations, remote sensing offers a rapid and comprehensive way of monitoring ecological conditions in these areas. Satellite monitoring since the early 1980s has made it possible to monitor vegetation conditions on a continental scale for Africa (Tucker, 1996).Anomalous rainfall floods mosquito-breeding habitats called dambos, which contain transovarially infected mosquito eggs. The eggs hatch Aedes mosquitoes that transmit the RVF virus preferentially to livestock and to humans as well. Analysis of historical data on RVF outbreaks and indicators of ENSO (including Pacific and Indian Ocean sea surface temperatures and the Southern Oscillation Index) indicates that more than three quarters of the RVF outbreaks have occurred during warm ENSO event periods. Mapping of ecological conditions using satellite normalized difference vegetation index (NDVI) data show that areas where outbreaks have occurred during the satellite recording period (1981-1998) show anomalous positive departures in vegetation greenness, an indicator of above-normal precipitation. This is particularly observed in arid areas of East Africa, which are predominantly impacted by this disease. These results indicate a close association between interannual climate variability and RVF outbreaks.

African Horse Sickness

African horse sickness (AHS), a lethal infectious disease of horses, is caused by a virus transmitted by *Culicoides* biting midges. Large outbreaks of AHS in the Republic of South Africa over the last 200 years are associated with the combination of drought and heavy rainfall brought by the warm phase of the El Niño Southern Oscillation (ENSO) (Baylis et al., 1999)

Classical Swine Fever

GIS technology to spatially separate and analyze densely and sparsely populated livestock areas in Northwest Lower Saxony in Germany, as part of the strategies for fighting animal diseases such as Classical Swine Fever (CSF). Their work was part of the European Community (EC) project titled Development of Prevention and Control strategies to address animal health and related problems in densely populated livestock areas of community(FAIR CT 97-3566). Circles with appropriate radius depending on risk

factors were drawn around location of outbreaks. For control measures, restrictions ranging from killing animals in inner circle to prohibiting trade in outer circles were to be imposed. By using a veterinary GIS shell, the numbers of animals within a given circle around every individual farm could be checked.

Conclusion

The application of veterinary geo-informatics has become the most effective approach to the control of animal diseases which do not respect spatial or temporal boundaries. Diseases like rinderpest, contagious bovine pleuropneumonia, Newcastle disease, African swine fever and foot and mouth disease, as well as the new and emerging transboundary zoonotic diseases of public health importance such as the bird flu and SARS are already prevalent and are of significant socio-economic and public health relevance. Application of GIS and GPS geo-informatics also enhances the spatial auditing of abattoirs, the first point of concentration of animals and of great epizootiological and public health importance for detection, surveillance, monitoring and control of animal and human diseases, such as brucellosis, helminthiasis, anthrax and tuberculosis (Morris, R.S.)

GIS has opened new vistas for Epizootiological studies of disease phenomenon in populations and in the context of their environment, both in human and veterinary medicine. It also has applied research value for prediction, prevention and control of diseases and other problems of populations and their environment. They are also integral part of the veterinary decision support system and information system

An environmental context predisposing to the occurrence of various endemics can be captured by the spatial, temporal, and spectral resolutions of RS satellite onboard sensors. Remote sensing, combined with other technologies like GPS (*Global Positioning System*), capable of spatially locating the event, and GIS (*Geographic Information System*), add qualified information for the identification of vulnerable ecosystems, at a relatively low cost, thus providing an important ancillary (and previously little-explored) tool for studying certain endemics and supporting surveillance and control activities.

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IMPLEMENTATION OF HACCP IN MEAT PROCESSING SECTOR

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Introduction

The Hazard Analysis Critical Control Point (HACCP) system is a scientific approach to quality control in meat and allied industry. It is designed to prevent problems by making sure that controls are applied at any point in a food production system where hazardous or critical situations could occur. Both the concept and practice of the HACCP system for the first time began with the Pillsbury Company's projects in food production and research for the space program at that time. The HACCP system was first made public during the 1971 National Conference on Food Protection. Since then, it has been adopted by many countries around the world as per their convenience in different dimension of food production.

Preliminary routine work before Developing an HACCP Plan

Most experts in this field believe that a company will do a better job of developing the HACCP plan if it first takes some preliminary steps.

It is strongly recommended that companies should have more than one person working on the development of their HACCP system. It is one of those tasks that are probably best done by more than one person, even in a small company.

HACCP is an overall process control system. We believe it takes different kinds of knowledge and experience to develop a good system. If there are only a few people in the company, they may all need to be in the HACCP team, because they all probably have multiple roles and responsibilities in the company's operations. It should also be consider including people from outside the company on the HACCP team. The people need to be available for plan development and for certain other functions, such as reassessing the HACCP plan.

Illustrate the Food and Who It Is Intended for

The next step of work for the HACCP team is to describe the product(s) and their methods of production and distribution. If the team includes the people who know how things work in your operations, they should be able to do this quite efficiently. The important thing for them to keep in mind is that they must include every step of the process. The following questions should be answered when the product is being described:

1. What is the ordinary name of the product?

2. How the products will be used?

3. What type of packaging is required for the product?

4. What is the shelf life of the product, at what temperature?

5. Where product will be sold? Who is the intended consumer and what is the intended use?

6. What the labelling instructions required?

7. Are special distribution controls needed?

Develop a Process Flow Diagram

A flow diagram is a simple chart of the process which is used use in the plant to produce the product. It needs to be an accurate, clear sketch of the process used in your plant to make the product. The best way to make sure the flow diagram is accurate is to have the HACCP team verify it by walking through the plant, and making sure all the steps in the process you carry out are included in the flow diagram.

Verifying the flow diagram should be done by the team carefully. It is a common way in which auditors or inspectors verify that a particular flow diagram is correct and complete. When it is confirmed that an accurate flow diagram has prepared and the team has verified it, it is time to move to the final step.

Groping of the products if possible

This part of the regulations lists nine process categories into which meat and poultry production can be grouped. The nine categories are listed below, together with some examples.

1. Slaughter, all species: Beef, swine, and poultry

2. Raw product, ground: Ground beef, ground pork, ground turkey

3. Raw product, not ground: Boneless cuts, steaks

4. Thermally processed, commercially sterile: Canned beef stew, pasta with meat

5. Not heat treated, shelf stable: Dried salami

6. Heat treated, shelf stable: Beef jerky

7. Fully cooked, not shelf stable: Hot dogs, wieners, roast beef, ham

8. Heat treated but not fully cooked, not shelf stable: Partially cooked patties, bacon

9. Product with secondary inhibitors, not shelf stable: Corned beef, cured beef tongue

Seven Principles for HACCP System

HACCP is usually defined as a preventive, seven-principle approach to food safety. The steps include:

1. Hazard analysis and assessment;

2. Determining critical control points (CCPs);

3. Establishment critical limits for CCPs;

4. Monitoring critical limits;

5. Correcting deviations from critical limits;

6. Establishing an effective record keeping system and;

7. Verifying that the HACCP program is working correctly.

Analysis of a Hazard

The first principle of HACCP is to conduct a hazard analysis. Before beginning the process, it is necessary to review the definitions of food safety hazards and preventive measures.

Conducting a hazard analysis is generally considered to be a two-step process. The first step is to identify the threats to human health which might be introduced into meat and poultry products during processing. These hazards are usually grouped into three categories: Biological, chemical, and physical.

Biological Hazards

Biological hazards are living organisms that can make food unsafe to eat. It may be bacteria, parasites, or viruses and are frequently associated with the raw materials from which meat and poultry products are made, including living animals and birds.

Sometime it introduced during processing; by people involved in the processing; from the environment in which foods are processed; from other ingredients in the products; or from the processes themselves.

Some of the major pathogens that may be associated with meat and poultry products are: Salmonella spp., Campylobacter jejuni, Escherichia coli 0157:H7, Listeria monocytogenes, Clostridium botulinum, Staphylococcus aureus and Yersinia enterocolitica.

Chemical Hazards

Chemical hazards may be described as some agents which occurs naturally in foods, or something added during processing. Harmful chemicals have been associated with both acute illness and chronic illness. Naturally occurring chemical hazards are those that are natural constituents of foods and not the result of other environmental contamination, among them aflatoxins, mycotoxins and shellfish toxins are important.

Added chemical hazards are those which are intentionally (or sometimes unintentionally) added to food during growth of animals, harvesting, storage, processing, packaging or distribution of products. This group of chemical hazards is very broad. It might include components of animal feed or drinking water, animal drugs, pesticides, food ingredients themselves, or chemicals used in the processing plant such as lubricants, cleaners, paints and coatings.

Physical Hazards

A physical hazard is a component of a food that is unexpected and may cause illness or injury to the person consuming the food. Foreign materials such as glass, metal or plastic are recognizable physical hazards in meat and poultry products. They usually occur because a piece of equipment has not been properly looked after while the food was being produced. There are a number of situations that can contribute to physical hazards in foods. They include:

1. Contaminated raw materials;

2. Poorly designed or poorly maintained facilities and equipment;

3. Contaminated packaging materials; and,

4. Inattention to details by employees with key responsibilities.

The first step in identifying hazards should be to use the flow diagram and product description which created in the preliminary steps. It should be in mind what could occur at each step in the process.

The second step in performing a hazard analysis is to identify the preventive measures that could be used to prevent each hazard. These are the physical, chemical, or other means that can be used to control a food safety hazard.

Process of locating of Critical Control Points

The next step after hazard analysis in HACCP principle is to identify the critical control points (CCPs) in the processing. A CCP is a point, step/ stage, or procedure in a food processing system at which control can be applied. As a result, a food safety hazard can be eliminated, or reduced to acceptable limit.

The next step is to find the point or points in the process where these preventive measures should be applied. Some common points where control can be applied in meat processing and handling includes:

1. Chilling to the particular temperatures which minimize microbial growth

2. Cooking at a specific temperature for an particular period of time in order to destroy microbial pathogens and non pathogenic spoilage organism

3. Product formulations, such as the addition of cultures or adjustment of pH or water activity;

4. Important processing steps, such as filling and sealing cans; and,

5.Slaughter procedures such as evisceration, banging or anti-microbial interventions.

Establishment of Critical Limits

A critical limit is the maximum or minimum value to which a physical, biological or chemical hazard must be controlled at a critical control point. This criterion must be met in order to prevent, eliminate, or reduce to an acceptable level an identified food safety hazard.

A critical limit will usually be a reading or observation such as a temperature, a time, a product property such as water activity, or a chemical property such as available chlorine, salt concentration, or pH.

Critical limits need to be exact and specific. HACCP plans should use a measurement, not a range of measurements, as critical limits. There are two types of critical limits. A critical limit can be an upper limit which cannot be exceeded. A critical limit can also be a lower limit, where a minimum amount is required to keep the food safe. A temperature in a grinding room of 15oC to help control pathogen growth is an example of an upper critical limit. An example of a lower critical limit would be the addition of an acidifier to inhibit bacterial growth.

How to Establish Monitoring Procedures

Monitoring procedures are carried out routinely, either by employees or by mechanical means, to measure the process at a given CCP, and create a record for future use. Other monitoring procedures are records from instruments such as recording thermometers. Continuous monitoring is always preferred if it is possible. If it is not possible

When monitoring procedures show that there has been a deviation from a critical limit, corrective action needs to be applied. Generally, physical and chemical procedures are preferred over microbial approaches for monitoring, because they provide more rapid feedback.

Deciding the Corrective Action

HACCP is a preventive system to correct problems before they affect the safety of food products. Deviations from critical limits will occur, so there is need to have a plan to make sure those deviations do not lead to unsafe products. For each CCP, you need to devise a standardized set of actions that company employees will follow when there is a deviation from a critical limit.

How to Establish a Record-Keeping System

The practice of HACCP requires that a full set of records to be kept about both plan development and the operation of the system. Clearly, more sophisticated records are required for more complex operations. One way to approach the record-keeping requirements of the HACCP system is to review the records already kept, and whether they are suitable. Perhaps they may need minor modifications for the HACCP system. The best record-keeping system is usually a simple one that can be easily integrated into your existing operation.

Validation of a HACCP System

The final principle of HACCP is to establish verification procedures, to make sure the plan is working correctly. It is needed to decide the procedures your plant needs to carry out in order to do this, and how often they should be performed.

Verification makes use of procedures and tests in addition to those used in monitoring, to see whether the HACCP system is in compliance with the HACCP plan or whether it needs modification. Ongoing verification ensures that the HACCP plan is working effectively on a day-to-day basis. This type of verification includes such tasks as calibrating monitoring instruments, observing monitoring activities and corrective actions, and reviewing HACCP records to see that they are being kept according to the plan. Reassessment is an overall review of the plan that must be performed at least annually, or whenever any changes occur that could affect the hazard analysis.

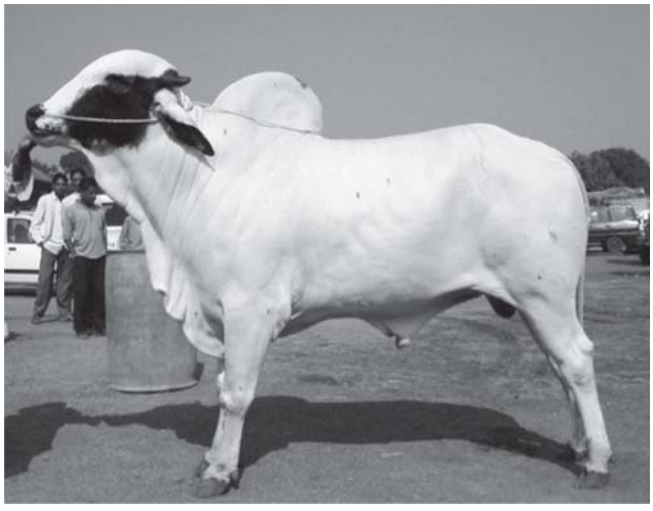
Conclusion

Today's demand in food processing sector is prioritized on consumer safety and health. Therefore the hygienic production and processing of animal originated food is also given a prominent emphasis. The quality and sanitized meat production is depends on the proper management of the production chain by following a particular process, which is accomplished by HACCP successfully. Therefore proper utilization of HACCP and concluding into good results is expected in meat processing sectors.

Deoni Cattle - pride breed of India

Vivek .M Patil[1] ,Vijay Kumar .M[2], U.Sunilchandra[2], Shrikant Kulkarni[3]

The Deoni is an important dual-purpose breed of cattle in India. These animals are quite popular in the tracts of former Hyderabad State which now forms the north-western part of Andhra Pradesh and adjoining districts of Karnataka and Maharashtra. Their crosses with Holstein and Jersey are very good milk yielders. Deoni cattle are hardy and well adapted to their breeding tract and constitute an important cattle genetic resource of India.



Origin : The Deoni breed of cattle also sometimes known as *Dongari/Dongarpati* ("of the hills"), *Surti* or *Deccani,* has been evolved within the last 200 years. The name of the breed is derived from the Deoni Taluka of Latur district of Maharashtra. It is claimed that it has been developed from a strain descended from a mixture of Gir, Dangi and local cattle. A contribution from the Gir type of cattle is quite evident in the formation of the head and ears, and also of the horns to a certain extent. They also show a great similarity in general conformation and ruggedness to the Dangi cattle of Bombay State, an area which is not far from the Deoni cattle breeding area (Joshi, 1953).

Characteristics :

The Deoni is a medium-sized animal which resembles the Gir in physical structure to a large extent. It is found in three colour variations viz. *Wannera* (clear white with black colour at the sides of the face), *Balankya* (clear white with black spots on the lower side of the body) and *Shevera* (white body with irregular black spots). The body is moderately developed and symmetrical with distinct muscles. Head is masculine, alert, broad and slightly convex. The colour of the head is black and white in Wannera and Shevera and completely white in the Balankya strain. The forehead is prominent, broad, slightly bulged and white in all the strains; ears are long and drooping with slightly curved tips; horns are medium, thick, apart and emerge from the sides of the poll; tips of the horns are blunt; and eyes are prominent, bright and alert with black eyebrows.

The hump is massive and well developed in males and small in females. The neck is short, strong and well developed. Dewlap is thick, pendulous, and muscular with folds. It is more pendulous in males than in females. The chest is deep and wide. The skin of these animals is thick and loosely attached to the body. The tail is long reaching below the hock with black and white switch. The udder is well attached and medium in size with squarely placed black teats. Bulls are characterized by blackish scrotums of a good size. The animals are docile and calm. The hair is soft and short. The cows have a fairly well-developed udder. The hooves are well-made and shapely and of a black color. The body is massive and upstanding with considerable depth and gives an appearance of strength. (ANSI)

Horn length, ear length, head length, chest girth, body length and height averaged 17.61, 26.18, 49.82, 151.82, 120.11 and 122.22 cm in adult cows and 19.97, 26.67, 53.68, 163.55, 129.59 and 134.36 cm in bullocks.

Milch Performance :

Cows of this breed are moderately good milkers,

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yielding about 1135 kg in a lactation period of 300 days. Well-bred herds in farms yield on an average up to 1580 kg during the same period. (Sastry, 2005). Government farms in Maharashtra have reported that Deoni cows have an average age at first calving at 1586.9 ± 29.4 days, lactation milk yield of 859.1 ± 23.6 lit, lactation length of 280.5 ± 4.6 days, and dry period of 173.3 ± 7.4 days. (Singhal, 1980). The attainable yield per lactation in Deoni cows is reported to be 880 kgs. The average fat content in the milk of Deoni cows was 4.3 percent.

Cows showed their first estrus at the average age of 36 months. Average age at first calving was 46 months. Service period and inter-calving period averaged 170 and 447 days. (Singh, 2002).

Draught Performance :

Deoni bullocks are good for heavy work and are particularly suitable for intensive cultivation. A bullock pair was able to pull the load of 10-11 quintals using wooden heavy cart with wooden wheels on *kutcha* (muddy) road. They are able to pull a maximum of 28-30 quintals of load using a light steel bullock cart with tyre wheels on tar roads for about 10-15 km. One pair of bullocks can pull the medium plough for about seven to eight hours a day and can plough about half an acre of land. The bullocks show their maximum potential at five to six years of age and maintain it up to 10-12 years of age. (Singh, 2002).

Management Practices :

Traditionally, Deoni cattle are maintained under a semi-intensive system of management. They are usually reared by grazing in fallow lands, dry lands or bunds of the farms. The breeding bulls are usually stall fed. Very few farmers grow green fodder (maize and sorghum). The animals are also provided with maize/sorghum stovers, paddy straw, wheat straw and sugarcane tops as well as groundnut, urd (*Vigno mungo*) and arhar (*Cajanus cajan*) haulms. The calves suckle their dams before and after milking. Quantity of the dry fodder fed depends mainly on the availability of green fodder in the grazing areas. Some amount of concentrate is also given to the milking cows and working bullocks.

The animals are housed in either separate houses or a part of the owner's residence during the night. No weaning is practiced in the breeding tract. The males are separated after 20 months of age and trained for agriculture operations. They are usually castrated at 30 months of age and used for draught work at three years of age. The calf and adult mortality is negligible and the breed is hardy and well adapted to tropical drought-prone areas.

Government Farms :

1. Deoni Cattle Breeding Farm, Gudgaripalli, Andhra Pradesh.
2. Govt Farm, Kampasagar, Andhra Pradesh.
3. Livestock Research & Information Centre (Deoni), Hallikhed(B), KVAFSU, Bidar, Karnataka.
4. Govt. Farm, Udgir, Maharashtra.
5. Livestock Farm, Parbhani, MAFSU, Maharashtra.

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"Bakerwal Dog, a livestock guarding dog in Jammu and Kashmir"

Dar Latief[1] and Rashid Adil[2]

A livestock guarding dog is one that generally stays with livestock mostly sheep and goat without harming them and aggressively repels predators. The use of guarding dogs to protect livestock can be traced to many centuries B.C. in Europe and Asia (Black and Green, 1985). The dog chooses to remain with sheep because it has been reared from puppyhood with them. Its protective behaviors are largely instinctive, and there is relatively little formal training required other than timely correction of undesirable behaviors (e.g., chewing on ears, overplayfulness, and excessive wandering). Success of the dog is a result of a quality genetic background with an emphasis on proper rearing (Green, *et al* 1985). It is important to understand the distinction between herding dogs and guarding dogs. Herding dogs move sheep from one area to another by biting, chasing, or barking at the sheep. Herding dogs work according to signals (verbal and hand) from a handler, and they are generally not left alone with the sheep. Guarding dogs usually do not herd sheep, are discouraged from biting, chasing, and barking at sheep, and act independently of people (Scott and Fuller, 1965).

Bakharwal Dog

Breed: Bakerwal Dog.

Alternative names: Bakerwal, Bakerwal Mastiff, Gujar Dog, Gujar Watchdog, Kashmiri Sheepdog, Kashmiri Bakerwal Dog, Kashmiri Mastiff.

Height (male/female): 24-30 inches (61-76 cm)/ 24-30 inches (61-76cm).

The Bakerwal Dog is one of the oldest breeds of herding dogs in Central Asia. These strong boned, deep chested dogs with black and tan coloured coats have existed in the Pir Panjal mountain ranges of India's Kashmir Himalayas for thousands of years (Ranjitsinh, M.K, 1981). The progenitors of this herding species is unknown, although the breed is believed to be related to the ancient dogs of Central Asia particularly the Tibetan Mastiff. The masters of this breed, the nomadic Gujjar tribes believe otherwise. These dogs were utilized by these pastoral people for centuries and they believe that the Bakerwal Dogs are much older than the breeds considered to be their ancestors. Of course this belief was not scientifically proven. The Bakerwal Dog is an ancient working breed whose stature and working abilities were developed in the varied terrains and harsh climatic conditions of the Pir Panjal mountain ranges of India. These agile and fleet footed dogs are highly valued guardians of livestock that protects the sheep and the goats from wolves and other predators. The Bakerwal Dog comes in a variety of sizes. These dogs normally measures 24 inches at the withers although some specimens can be as tall as 30 inches. This is a strong boned breed. A Bakerwal Dog has a powerful body. The dog has a muscular chest and a straight topline. The dog has the large head typical to a molosser. The powerful neck blends smoothly to the broad well muscled shoulders. This is a double coated breed. The undercoat is dense and the flat lying outer coat is very thick. The coat provides the dog with protection from the harsh mountain climate. The Bakerwal Dog is speculated to be related to other mastiff type dogs of Central Asia because of the build and the coat coloring. A black and tan colored coat is most common for this breed although some specimens are noted to have tricolored coats. Piebald Bakerwal Dogs are also found (Prashad, R. 1992).

These Bakerwal dogs are owned by Gujjars and Bakerwals in Jammu and Kashmir.The Gujjars and Bakerwals according to the historians originally belong to Rajputana region of Gujara (Kathiawad) and due to famine and other hostile conditions, they migrated to this area. Historians could not trace out their exact date of migration but as per RAJ TARANGNI, the famous history book of ancient Kashmir they were living on the borders of Kashmir in 9th and 10th centuries. After some time they embraced Islam and later on divided into two

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professionally different sects of Gujjars and Bakerwals. Both the communities are having their common cultural and linguistic heritage. Gujjars mostly rear cattle and they are herdsmen of buffaloes and possess small pieces of lands, kacha houses on the slopes and foothills of mountains in Rajouri District. Number of them is having their Dhokes and dharas on the upper reaches of Rajouri district mostly in Darhal, Budhal, Kalakote and Manjakote area. On the other hand, Bakerwals are the offshoots of Gujjars and they are nomadic tribes. Most of them are landless and houseless. Their livelihood is mostly dependent on sheep and goats for which they have to rear these animals. In search of green pastures for their herds and flocks, they travel from one place to another with their baggage and luggage, flock of sheep and goats, fleet of horses and dogs (Kapoor *et al,*1994).

For thousands of years Bakerwal breed of dog has existed with these nomadic tribes. These dogs were specifically bred to be livestock guardians and settlement protectors. The Bakerwal Dogs are resilient dogs that are serious in performing their tasks. These dogs are commonly seen with large herds of sheep and goats. The Bakerwal Dog is a serious worker and considered to be the most resilient species of herding dog in India's Himalayas. This breed is a most able helper of the Gujjar tribes during tribal migration. The dog is commonly seen herding large herds of sheep and goats in hilly and remote areas. The Bakharwal dog is highly valued for being a serious worker- an excellent breed of herding dog. This breed has the strength, the courage and the ferociousness of a Jaguar. When it comes to protecting the animals under it care, this dog will not be intimidated by larger predators. This dog protects the sheep and the goats from wolves but these ferocious dogs would fight tigers, bear, and lions as well as any other predators. These serious workers make suitable companions too. A Bakerwal dog is loyal, affectionate and very protective of its masters. These dogs form a strong bond with its people. The dog is known to be good with children and tolerates other non-dog pets. These are intelligent dogs but because their independent nature was honed by time, these dogs can be quite difficult to obedience train. When herding, these dogs would act independently. The master's command would not be necessary as the dog would move with alacrity when there is a necessity to protect its charges. As mentioned, this dog would make a suitable home companion but a prospective owner must have what it takes to be the dog's leader otherwise this dog will take advantage and be a hard to handle pet. A Bakewal Dog is a working dog. As such it is expected to have high exercise requirements that cannot be met if the dog is to live in apartments. A home with a large yard would make sure that the dog is given the opportunities to run, to play and to let off pent up energies.

Sadly, this herding dog is on the brink of extinction. A survey conducted by India's Tribal Research and Cultural foundation on this indigenous dog of Kashmir and Jammu disclosed that only a few hundreds of these dogs are in existence. Since the pastoral tribes of Gujjar and Bakerwal have relinquished the nomadic life and settled in various places, the number of Bakharwal Dogs started to decline. The insurgency in the higher regions of India has caused hundreds of dogs to be killed. The remaining dogs exist in the most difficult conditions. If nothing is done to preserve the breed it is possible that the Bakharwal Dog will be lost to the world in the next few decades (Suhail and Baba, 2002).

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PATHOGENICITY ISLANDS OF STAPHYLOCOCCUS AUREUS

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S. aureus is a common commensal found on human skin and respiratory tract mucosal surfaces. However, it is also a pathogen that is associated with a tremendous variety of human diseases ranging from self-limiting skin infections to life-threatening pneumonia or sepsis; nosocomial infections by *S. aureus* are common. A variety of toxins, such as hemolysins, staphylococcal exotoxins (Set), and superantigens (enterotoxins, exfoliative toxin, toxic shock syndrome toxin), are major virulence factors of *S. aureus*. These toxins are involved in the pathogenesis of staphylococcal diseases such as food poisoning, scalded skin syndrome, and toxic shock syndrome. Treatment of *Staphylococcus* infections becomes increasingly difficult, since resistance to a growing number of antibiotics has been observed in clinical isolates.

Genetic analysis of the virulence and resistance genes of various clinical isolates of *S. aureus* revealed that these genes are clustered in prophages and transoposons, as well as with genomic islands that have characteristic features of PAI. The availability of three genome sequences of methicillin-resistant *S. aureus* (MRSA) strains allowed a detailed comparison of the structure of PAI in *S. aureus.* A remarkable difference between PAI in *S. aureus* and PAI in gram-negative pathogens is the presence of large gene clusters with allelic variations of specific toxins, proteases, and enzymes involved in pathogenesis. The allelic forms may allow adaptation of the pathogen to the various host environments that are colonized during infection. Given the large number of different PAI in *S. aureus* and the variability in structure and gene content, it is likely that characterization of further clinical isolates will lead to the detection of an increasing number of PAI in this group of pathogens.

***Staphylococcus* cassette chromosome *mec*.** A major problem in the treatment of *S. aureus* infections is the presence of resistance to multiple antibiotics. Methicillin is the first semisynthetic, ß-lactamase-resistant penicillin for therapeutic use. Resistance to methicillin in MRSA strains is conferred by penicillin-binding proteins and is usually accompanied by resistance to variety of other ß-lactam antibiotics. It was observed that methicillin resistance is encoded by the chromosomal gene *mecA*. Analysis of the genome of MRSA strains revealed that antibiotic resistance genes are located within an unstable locus that has certain features of a PAI. The genomic island *Staphylococcus* cassette chromosome *mec* (SCC *mec*) carries the methicillin resistance determinants *mecI*, *mecR*, and *mecA*. The number of resistance genes located in SCC *mec* can vary among different strains and is dependent on the presence of transposons within SCC *mec*. In MRSA strains, the insertion of Tn *554* into SCC *mec* confers resistance to spectinomycin and erythromycin. The availability of genome sequences of several *S. aureus* strains indicated that the size and gene composition of SCC *mec* are highly variable and led to the distinction of allelic forms of SCC *mec* into types I to IV ; the size of SCC *mec* ranges from 20.9 to 66.9 kb depending on the allelic form . Type I and II SCC *mec* were identified in nosocomial isolates of MRSA.

In addition to resistance genes, SCC *mec* encode the recombinases CcrAB and is flanked by *att* sites. Under experimental conditions, CcrAB can promote the excision of SCC *mec* from, or the site-specific integration into, the chromosome. Other genes present in the island are apparently not associated with virulence. The presence of SCC *mec* in a number of staphylococcal species has led to the suggestion that it is transmissible. Although *mecA* could be could be transferred experimentally by phage transduction to other staphylococcal species, no naturally occurring transducing bacteriophage which is capable of transferring genetic material across the species barrier has been described.

PAI encoding toxic shock syndrome toxins. In addition to SCC *mec*, a larger number of genomic islands have been identified. It was observed that chromosomal *tst* genes encoding toxic shock syndrome toxins (TSST) are located on mobile

genetic elements that were distributed among *S. aureus* strains.

TSST-1 and enterotoxins of *S. aureus* function as superantigens . Staphylococcal superantigens are a group of high-molecular-weight pyrogenic proteins that are potent stimulatory agents for $CD4^+$ T lymphocytes. As such, they can have profound effects on the immune system. They stimulate T cells by cross-linking the variable part of the ß-chain of the T-cell receptor with major histocompatibility complex class I molecules on accessory or target T cells outside the peptide-binding groove area. This will result in a nonspecific activation of a large proportion of T cells. Staphylococcal superantigens are associated with food poisoning, toxic shock syndrome, multiple sclerosis, Kawasaki's disease, and atopic allergy.

Analysis of the flanking regions of the *tst* gene identified a PAI that has been termed SaPI1. Beside *tst*, a gene encoding a homologue of VapE of *D. nodosus* and a putative enterotoxin have been identified. SaPI1 is 15,233 bp long and is inserted in an att_C site close to the *tyrB* gene. Remarkable features of SaPI1 are its mobility and instability. The excision of SaPI1 from the chromosome and its presence as episomal DNA was observed. This study also identified a second locus carrying a *tst* gene that was referred to as SaPI2. Transduction of SaPI1 and SaPI2 by particles of helper phages was demonstrated. In the absence of these helper phages, these islands remain stably integrated in the chromosome.

A PAI related to SaPI1 was identified in a bovine isolate of *S. aureus*. SaPIbov is 15,891 bp long and is inserted at the 3' end of the GMP synthase gene (*gmps*). It harbors the enterotoxin genes *sec* and *sel* as well as the *tst* gene. A third PAI, termed SaPI3, was identified by Yarwood et al. This locus contains *sek* and *seq*, encoding two novel enterotoxins, and the overall structure is similar to that of SaPI1. The *att* sites flanking the PAI are identical; however, a *tst* gene is absent from SaPI3.

Sa families of PAI. Comparative analyses of the genomes of six *S. aureus* isolates defined six families of PAI and led to the renaming of previously identified PAI to Sa1, Sa2, Sa3, Sa4, Sa, and Saß , where stands for "island." Depending on the authors, the loci have different designations; for consistency we follow the most comprehensive nomenclature suggested by Baba et al. Islands Sa1 to Sa4 harbor integrase genes as putative elements of genetic mobility. Furthermore, these PAI are flanked by *att* sites. In contrast, members of the Sa and Saß families harbor transposase genes, indicating that transposons may have been the origin of these elements.

(i) Sa1 to Sa4. The designation Sa1 was suggested for a family of genomic islands including the Sa1 locus of community-acquired *S. aureus* MW2 and PAI previously termed SaPI1 and SaPI3 . PAI of this family harbor large clusters of genes for enterotoxins and encode TSST. The Sa2 family comprises Sa2 of community-acquired MRSA and SaPIbov of a bovine *S. aureus* isolate. Like Sa1, these loci harbor genes encoding enterotoxins and TSST. Sa3 has been identified in community-acquired MRSA strain MW2 and nosocomial MRSA strains Mu50. The type II Sa3 of strain MW2 harbors novel allelic forms of the enterotoxin genes *sel* and *sec*. The spontaneous excision of Sa3 from the chromosome and formation of an episomal circular DNA occurs frequently. The Sa4 family includes several allelic forms of a genomic island in nosocomial and community-acquired MRSA infection. Locipreviously referred to as the TSST-1 islands SaPIn1 and SaPIm1 of nosocomial MRSA isolates are now referred to as type I Sa4. Type I Sa4 of nosocomial isolates harbors virulence genes encoding allelic forms of enterotoxin *sel* and *sec* and the *tst* gens encoding TSST. In contrast, the *tst* gene is absent in type II Sa4 of community-acquired MRSA. Spontaneous excision of Sa4 was observed, but the frequency was lower than that of excision of Sa3.

(ii) Sa. The Sa islands are present in all sequenced *S. aureus* genomes, but the size and number of ORF in this group is variable. Exotoxin islands previously designated SaPIn2 and SaPIm2 are members of the Sa family. The loci contain up to 11 allelic forms of *set* genes for putative staphylococcal exotoxins, the *lukDE* genes encoding leukotoxins, and lipoprotein gene clusters.

(iii) Saß. Like Sa, the Saß genomic islands are present in all sequenced genomes, but the size and gene composition of the various Saß islands are

highly variable among isolates. Enterotoxin islands previously referred to as SaPIn3 and SaPIm3 belong to this family. A cluster of genes encoding serine proteins is present in all varieties of Saß. Superantigen gene clusters are observed in nosocomial MRSA strains but absent in community-acquired MRSA strains. The *bsa* gene encoding a putative bacteriocin is present only in type II Saß of community-acquired MRSA strains, and this toxin could be important for competition with other bacteria in an environment outside the host.

Neither Sa nor Saß is spontaneously excised from the chromosome. In these islands, transposase genes are present that are inactive due to frameshifts.

There are also several prophages in the genomes of various *S. aureus* isolates that harbor various genes encoding toxins. The presence of *int* genes and *att* sites in the PAI of *S. aureus* suggests a close relationship between PAI and bacteriophages in *S. aureus*, indicating that several of the PAI in this species have been acquired in form of phage genomes. Baba et al. classified prophages Sa1, Sa2, and Sa3. Novel allelic forms of the *luk* genes for leukotoxins of the "Panton-Valentine leukocidin" class are present on Sa2. The enterotoxin genes *sea*, *seg*, *sek*, and *sak*, encoding staphylokinase, have been identified in members of the Sa3 family.

***etd* PAI.** The analysis of loci of genes encoding exfoliative toxins ETD and EDIN-B recently led to the identification of a further locus termed *etd* PAI . The *etd* PAI in clinical *S. aureus* isolate TY114 is 9,054 bp long and absent in MRSA strain N315. This locus contains *etd* and *edin-B*, encoding the exfoliative toxins. The purified ETD toxin exhibited exfoliative activity in a murine model . The locus also contains a restriction/modification system and an IS element and is flanked by short DRs. A linkage to *etd* was observed in all clinical isolates positive for *edin-B*, and the *etd* PAI is also frequently distributed among strains that are not associated with scalded skin syndrome or other exfoliative forms of *S. aureus* infections.

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DIETARY MANAGEMENT OF HEPATIC DISORDERS IN RUMINANTS

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Introduction:

The liver, the largest organ in the body, is essential in keeping the body functioning properly, because of its key role in many complex metabolic processes; the liver is subject to damage by a wide variety of diseases. Liver disease is any destructive or metabolic disorder involving the liver and is not limited to any particular age or breed. It is located in the abdomen, under the diaphragm. The liver is divided into sections (known as lobes), each of which is composed of thousands of structural & functional units (hepatic lobules).Two blood vessels enter the liver. The hepatic portal vein contains de-oxygenated blood from the spleen, pancreas & digestive system & the hepatic artery contains oxygen rich blood from the lungs. It serves many complex functions. It removes or neutralizes poisons from the blood, produces immune agents to control infection, and removes germs and bacteria from the blood. It makes proteins that regulate blood clotting and produces bile to help absorb fats and fat-soluble vitamins. This organ is the main industrial center of the body, and it has the enormous task of maintaining the body's metabolic equilibrium (homeostasis).

The liver has a double edged nature which, while being life preserving, makes diagnoses and treatment of liver disease extremely difficult. The liver has a tremendous reserve capacity, which means that it can easily perform it's duties with up to 70 to 80 per cent of the liver mass affected by disease. Liver disease is most easily conquered early, but the very nature of the liver makes this a difficult task. However, the liver is the only organ in the body which is capable of complete regeneration and thus if it is possible to successfully treat the disease, there is a chance of complete recovery.

The liver in disease:

As a result of these many functions, liver disease can affect just about any other part of the body and thus the symptoms of liver disease are not always specific. Furthermore, because the liver acts as a "biochemical cross roads" for the body, it is affected by a wide range of diseases, including viral and bacterial infections, degenerative disease, cancer, and toxic insults. Because the liver has a large reserve, signs are not evident until much of it is damaged. While it is important to consider the liver when examining any sick animal, liver disease is one of the more difficult challenges for the veterinarian.

Common important liver disorders in ruminants:

Fatty liver disease of cattle:

Fatty liver is most common in periparturient cattle. Although often considered a postpartum disorder, it usually develops prior to and during parturition. Endocrine changes associated with parturition and lactogenesis contribute to the development of fatty liver; however, inappetence almost always accompanies severe cases. Cows that are over conditioned at calving are most likely to develop fatty liver. The disease can develop whenever there is a decrease in feed intake and may occur secondary to the onset of another disorder. Cows that develop fatty liver at calving are more susceptible to ketosis.

Etiology and pathogenesis:

Fatty liver occurs during periods when blood non esterified fatty acid concentrations (NEFA) are elevated. The most dramatic elevation occurs at calving when plasma concentrations are often >1,000 µEq/L. Concentrations can reach that level if the animal goes off feed. Uptake of NEFA by the liver is proportional to NEFA concentrations in the blood. Therefore, under conditions of elevated hepatic NEFA uptake and esterification, triglycerides accumulate. Oxidation of NEFA leads to the formation of CO2 and ketones, primarily acetoacetate and â-hydroxybutyrate. Ketone formation is favored when blood glucose concentrations are low. Conditions that lead to low blood glucose and insulin also contribute to fatty liver because insulin suppresses fat mobilization from adipose tissue.

Fatty liver is a consequence of negative energy balance, not positive energy balance. Energy consumption above requirements for maintenance and productive purposes will not directly result in

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deposition of triglyceride in hepatic tissue. Triglyceride deposition will occur only if the animal becomes over conditioned and consequently reduces feed intake.

Clinical findings and diagnosis:

Fatty liver is likely to develop concurrently with another disease, typically disorders that are seen at or shortly after calving. These include metritis, mastitis, displaced abomasum, acidosis, and hypocalcemia. Cows with fatty liver are more prone to develop ketosis. Over conditioned cows exhibit poor feed intake prior to and after calving and, therefore, are susceptible to fatty liver. Similarly, obese cows do not necessarily have fatty liver. It is unlikely that triglyceride accumulation in the liver is a direct cause of downer cow syndrome.

Diagnostic tools for fatty liver are of limited value. Liver biopsy is the only reliable method to determine severity of fatty liver in dairy cattle. Estimation of triglyceride content by flotation characteristics of the tissue in copper sulfate solutions of varying specific gravity is rapid, easy, and available for use under field conditions. Measurement of plasma NEFA is a popular diagnostic tool for identifying herds that may be at risk for fatty liver. Blood and urine metabolites or blood enzyme activity have been proposed as diagnostic tools. Blood glucose concentrations are low and blood NEFA and â-hydroxybutyrate concentrations are high when conditions are conducive to the development of fatty liver. Blood cholesterol concentration is usually low when fatty liver occurs, which may reflect an impaired ability of the liver to secrete lipoproteins. AST, ornithine decarboxylase, and sorbitol dehydrogenase are hepatic enzymes that may be positively associated with liver triglyceride and liver damage. Use of ultrasound as an alternative noninvasive procedure is being developed for determining the severity of fatty liver.

Prevention, treatment and control:

Reducing severity and duration of negative energy balance is crucial in the prevention of fatty liver. This can be achieved by avoiding over conditioning cattle, rapid diet changes, unpalatable feeds, periparturient diseases, and environmental stress. The critical time for the prevention of fatty liver is ~1 wk prior to calving through 1 wk after parturition. This is when cows are most susceptible to development of fatty liver.

Glucose or glucose precursors are effective because they may cause an insulin response. Insulin is antilipolytic, i.e., it decreases lipid mobilization from adipose tissue. A single 100 IU IM dose of a 24-hr slow-release insulin immediately after calving may be prophylactic. Higher doses may cause severe hypoglycemia and should not be used without concurrent glucose administration. Glucagon stimulates glycogenolysis, gluconeogenesis, and insulin production. In contrast to nonruminants, there is a negligible lipolytic effect of glucagon in ruminants. Glucagon (10 mg/day, IV, for 14 days) is effective at reducing liver triglyceride. Niacin is an antilipolytic agent that may have potential for prevention of fatty liver.

Minimizing stress is important for prevention of fatty liver. Sudden changes in environment should be avoided. For example, changes in ration, housing, temperature, herdmates, etc may cause a reduction in feed intake and trigger catecholamine-mediated increases in fat mobilization. In essence, treatment is the same as prevention; attempts should be made to avoid negative energy balance and to minimize fatty acid mobilization from adipose tissue. Once positive energy balance is attained, liver triglyceride can be reduced significantly in 7-10 days.

Hepatic abscesses:

Epidemiology and pathogenesis:

The primary etiologic agent of liver abscesses in cattle is *Fusobacterium necrophorum*. They are most common in feedlot and dairy cattle fed rations that predispose to rumenitis. In goats, most abscesses are due to *Corynebacterium pseudotuberculosis*. *Actinomyces pyogenes* and *Escherichia coli* are also common. Organisms less frequently isolated include *Proteus sp*, *Pasteurella haemolytica*, *Staphylococcus epidermidis, S aureus, Rhodococcus equi , Erysipelothrix rhusiopathiae ,* and the yeast *Candida krusei*. Hepatic abscesses are most prevalent in ruminants. Abscesses are associated with bacteremia, septic portal vein thrombosis, parasite migration, or extension from intestinal disease. In neonates and young animals, abscesses may develop secondary to ascarid migration, bacterial septicemia, or ascending infection of the umbilical vein. Often, liver abscesses are subclinical in cattle.

Clinical findings and diagnosis:

Animal with liver abscesses seldom exhibit clinical signs. Detailed clinical examination may show periodic fever, in-appetence, and evidence of pain when pressure is applied to the xiphisternum and posterior rib cage on the right side. Grunting and

other signs of pain may occur with movement or when the animal lies down. Ultrasonography is an aid to diagnosis but abscesses in the left side of the liver may not be visualized. Feedlot cattle with abscessed livers have reduced feed efficiency, and those with severely abscessed livers gain 5-15% less per day than cattle without abscesses. Rupture into hepatic veins can also lead to thrombophlebitis of the posterior vena cava with thromboembolic disease, endocarditis, pulmonary thromboembolism, multiple pulmonary abscesses, and chronic suppurative pneumonia. Caudal vena caval thrombosis may also lead to portal hypertension with a resulting syndrome of hepatomegaly, ascites, and diarrhea.

Prevention, treatment and control:

The primary control is by controlling ruminal acidosis through the method of feeding, diet composition, diligent feed bunk management, and the use of buffers in the diet. Fewer ruminal lesions develop when the ratio of concentrate to roughage is decreased. Increased roughage in the ration and multiple daily feedings increase the time of mastication and saliva flow; this increases buffer to the rumen and provides a continuous and uniform fermentation that reduces intraruminal acidity, which in turn lowers the number of ruminal lesions and, indirectly, the number of liver abscesses. Tylosin phosphate fed at 10 g/ton of feed significantly reduces the number of liver abscesses and increases feed efficiency and weight gain but has little, if any, effect on prevalence of ruminal lesions. Virginiamycin fed at 16 g/ton of feed or chlortetracycline fed continuously at 70 mg/head/day during the finishing period is also used. Leukotoxoid vaccines reduce abscess incidence and severity.

Acute hepatic necrosis:

Epidemiology and pathogenesis:

Acute hepatic disease and failure in cattle most commonly results from a toxic insult. Hepato-cellular necrosis with clinical and laboratory evidence of hepatic failure may develop in cattle after mastitis or metritis with clinical signs of endotoxemia. Endotoxin induces hepatocellular necrosis through both direct and indirect effects on the liver. Endotoxin can cause Kupffer's cells to release lysosomal enzymes, prostaglandins, and collagenase that damage hepatocytes, or it may interact directly with the hepatocytes, causing lysosomal damage, decreased mitochondrial function, and necrosis. Endotoxin-related hepatocellular necrosis may be due in part to decreased hepatic blood flow and liver hypoxia.

Clinical findings and diagnosis:

Clinical signs include weight loss, anorexia, and cessation of milk production. Photosensitization and mild icterus are variable. Serum SDH, GGT, and AST concentrations are mildly to severely increased. Fatty liver or ketosis is not characteristic. The liver may be normal in size or mildly enlarged. Histologically, there is marked hydropic change with varying degrees of hepatic necrosis.

Diagnosis is based on a history of hepatic-related signs developing concurrently or after a primary disease and endotoxemia. Increases in hepatic and biliary enzymes and absence of ketosis support the diagnosis. Definitive diagnosis is based on liver biopsy and by excluding other infectious, toxic, and inflammatory causes of hepatic dysfunction. Differential diagnoses include other causes of sub-acute or chronic liver disease (eg, hepatotoxins, hepatic lipidosis, and primary photosensitivity) and conditions causing weight loss and hypophagia.

Prevention, treatment and control:

Nutritional and fluid support is often successful in affected cows with acute hepatic necrosis after transient insults. Forced feeding of alfalfa meal (15% protein) and dried brewers' grain or beet pulp with potassium chloride and normal rumen fluid is recommended. Polyionic fluids with 5% dextrose, potassium chloride, and B vitamins may also be needed. Control of endotoxemia and treatment of the primary disease condition are essential.

Cholangiohepatitis:

Cholangiohepatitis is a severe inflammation of the bile passages and adjacent liver, which sporadically causes hepatic failure in ruminants.

Etiology and pathogenesis:

Bacteremia due to an organism (eg, *Salmonella*) eliminated in the bile, an ascending infection of the biliary tract after intestinal disturbance, or ileus is thought to be related to the development of cholangiohepatitis. Parasite migration through the liver may predispose to cholangiohepatis in some animals. Gram-negative organisms, including *Salmonella sp, Escherichia coli, Pseudomonas sp*, and *Actinobacillus equuli* are frequently isolated from the liver. *Clostridium sp, Pasteurella sp,* and *Streptococcus sp* are less frequently recovered. In acute cases, the liver is swollen, soft, and pale. Suppurative foci may be visible beneath the capsule or on cut surface. Lesions in other systems may reflect septicemia and jaundice. Microscopically in

acute cases, neutrophils are present in the portal triads and degenerate parenchyma. Purulent exudate is evident in the ducts. In subacute or chronic cholangiohepatitis, the inflammation is more proliferative and bile duct proliferation more pronounced. Areas of atrophy, regenerative hyperplasia, and periportal fibrosis may be evident.

Clinical findings and diagnosis:

Depending on the severity of infection and virulence of the organism, clinical signs may be acute with severe toxemia, subacute, or chronic. Most typically, cholangiohepatitis is a subacute or chronic disease process with affected animals showing signs of weight loss, anorexia, intermittent or persistent fever, or colic. Icterus, photosensitivity, and signs of hepatic encephalopathy are variable. SDH, AST, GGT, bilirubin, and total bile acid concentrations are usually increased. Peripheral WBC counts are variable, depending on the degree of inflammation and endotoxemia present. Acute, suppurative cholangiohepatitis may occasionally result in severe septicemia and death.

Liver biopsy should be performed to confirm the diagnosis and to obtain a liver sample for aerobic and anaerobic culture and sensitivity. Differential diagnoses include other causes of acute to chronic hepatic disease, weight loss, colic, or sepsis.

Treatment and control:

Treatment based on culture and sensitivity results from liver tissue often gives favorable results. Therapy should be continued for 4-6 wk or longer. Liver enzyme (GGT) levels and biopsies should be repeated to monitor response to therapy. If no organism is cultured, broad-spectrum antimicrobial therapy against gram-negative, gram-positive, and anaerobic organisms should be administered. A combination of penicillin with either a trimethoprim-sulfa or an aminoglycoside or enrofloxacin may be used. Ampicillin or a cephalosporin can be used instead of penicillin. Prognosis is good if fibrosis is not severe.

Infectious necrotic hepatitis (black disease):

Infectious necrotic hepatitis is an infectious disease of sheep that is sometimes seen in cattle. **Etiology and pathogenesis:**

The etiologic agent, *Clostridium novyi* type B, is soil borne and frequently present in the intestines of herbivores; it may be present on skin surfaces and is a potential source of wound infections. Fecal contamination of pasture by carrier animals is the most important source of infection. The organism multiplies in areas of liver necrosis caused by migration of liver flukes and produces a powerful necrotizing toxin. The disease is worldwide in distribution, wherever sheep and liver flukes are both found. *C. novyi* has been suspected but not yet confirmed as a cause of sudden death in cattle fed high-level grain diets, and in which preexisting lesions of the liver were not detectable. The lethal and necrotizing toxins (primarily á toxin) damage hepatic parenchyma, thereby permitting the bacteria to multiply and produce a lethal amount of toxin.

Clinical findings and lesions:

Usually, death is sudden with no well-defined signs. Affected animals tend to lag behind the flock, assume sternal recumbency, and die within a few hours. Most cases occur in the summer and early fall when liver fluke infection is at its peak. The disease is most prevalent in 1- to 4-yr-old sheep and is limited to animals infected with liver flukes. Differentiation from acute fascioliasis may be difficult, but peracute deaths of animals that show typical lesions on necropsy should arouse suspicion of infectious necrotic hepatitis. The most characteristic lesions are the grayish yellow, necrotic foci in the liver that often follow the migratory tracks of the young flukes. Other common findings are an enlarged pericardial sac filled with straw-colored fluid, and excess fluid in the peritoneal and thoracic cavities. Usually, there is extensive rupture of the capillaries in the subcutaneous tissue, which causes the adjacent skin to turn black (hence the common name, black disease).

Control:

The incidence may be lowered by reducing the numbers of snails, usually *Lymnaea spp ,* that act as intermediate hosts for the liver flukes or by otherwise reducing the fluke infection of sheep. However, these procedures are not always practical, and active immunization with *C. novyi* toxoid is more effective. Longterm immunity is produced by one vaccination. After this, only new introductions to the flock (lambs and sheep brought in from other areas) need to be vaccinated. This is best done before the late summer.

Dietary management of hepatic disorders in livestock:

Dietary management is extremely important because supportive care allows time for hepatic regeneration and recovery in some patients. The goal is to provide all the necessary nutrients which may be lost due to

failure of liver processing without overtaxing the liver with regards to processing of dietary intake. High levels of top quality protein to provide the essential amino acids in an easily digestible carrier which will not produce high levels of ammonia during digestion. High level carbohydrates to drive the metabolism of the body, essential fatty acids and a good mineral and vitamin supplement. The primary goal for dietary management of liver disorders includes maintaining metabolic balance while providing nutrients for healing and regeneration of damaged tissue. Other important objectives include:

Nutritional support in liver disease is based on several primary factors:

- ❖ Reducing the metabolic demands placed upon the liver
- ❖ Maintaining optimal body weight and lean body mass while avoiding hepatic encephalopathy
- ❖ Overcoming nutritional deficiencies due to loss of hepatic function
- ❖ Protecting against ongoing hepatocellular damage
- ❖ Providing nutrients for hepatocyte regeneration and repair
- ❖ Minimizing inflammation, fibrosis, and complications such as ascites
- ❖ Avoiding production of liver-toxic and nerve-toxic compounds.
- ❖ Minimize the harmful effects of the damaging agent on the liver
- ❖ Encourage healing and regeneration
- ❖ Maintain the life of the animal until adequate liver function can be restored

Factors to overcome the hepatic disorders in livestock:

Energy:

Hepatocellular dysfunction is accompanied by derangements in carbohydrate metabolism that result in glucose intolerance and inability to maintain blood glucose concentrations. This dysfunction can stimulate catabolism of muscle proteins for gluconeogenesis. Dietary provision of complex carbohydrates, rather than simple sugars, can be of benefit by smoothing the postprandial glycemic, response reducing insulin requirements and the glucose load presented to the liver. Carbohydrates also promote insulin to glucagon ratio that favors an anabolic state in which amino acids absorbed from the small intestine are converted to protein rather than glucose. This also reduces the production of ammonia that accompanies the utilization of amino acids for gluconeogenesis.

Fiber:

Dietary fiber can modify the production, absorption, and elimination of ammonia and other neurotoxic microbial by-products from the large intestine. Fermentable fibers such as beet pulp and fructo-oligosaccharides (FOS) stimulate the incorporation of nitrogenous waste products into intestinal bacteria. Bacterial fermentation of fiber can also alter the colonic pH and reduce the production and absorption of ammonia. Through these dual mechanisms, fiber may reduce the risk of hepatic encephalopathy.

Minerals:

Zinc is an important cofactor involved in the detoxification of ammonia via the urea cycle. Zinc deficiency may result in increased blood ammonia concentrations. Dietary zinc supplementation may inhibit collagen production in the liver and reduce hepatic fibrosis. Zinc may also protect hepatocytes from free radical injury. Most importantly, zinc inhibits the absorption of copper from the small intestine through induction of metallothionein. Metallothionein is a protein that irreversibly chelates copper. The chelated complex is then excreted in the feces. With chronic hepatic disease, and copper storage diseases, copper accumulates within the liver. The accumulation of copper within hepatocytes initiates free radical generation, oxidative injury, and activation of collagen synthesis. The ultimate result is hepatocellular necrosis, sustained inflammation, and progressive fibrosis. Excessive dietary sodium, particularly in patients with hypoalbuminemia or portal hypertension, can precipitate the formation of ascites. Therefore, dietary intakes of sodium should be moderate in patients with liver disease.

Antioxidants:

There is evidence that free radicals play an important role in the pathogenesis of liver disease. Antioxidant supplementation may help to minimize hepatocellular

necrosis, reduce inflammation, slow fibrosis, and hence, minimize progression.

Conclusion:

Often dietary therapy is the single most important method of modifying the course of most spontaneous liver diseases. The goals of dietary therapy are to reduce the signs of sickness associated with liver failure and at the same time provide optimal conditions for liver repair and regeneration. Dietary therapy involves adjusting the diet so that optimal quantities and types of protein, carbohydrates, fats, vitamins and minerals are provided to the animal. The objective is to provide optimal nutrition, yet decrease the work load of the liver. Excessive levels of protein should be avoided since they add to the work of the liver. Particular emphasis should be placed on the available energy in the diet. This energy should be present in the form of easily digested carbohydrates and high quality fats.

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From the Editor's Desk.....

ప్రయత్నాలు ఫలవంతం కావాలి

జీవనోపాధికి పశుగణం పైన ఆధారపడిన వారికి అవకాశాలు ఎన్ని ఉన్నాయో, అవాంతరాలు కూడా అన్నే వున్నాయి. వినాయకుడి పెళ్ళికి వెయ్యి విఘ్నాలు అన్నట్టు యిందుకు కారణాలు చాలానే వున్నాయి. తక్కువ పశువైద్య కళాశాలలు వుండటం, పరిమితమైన సీట్లు, పశువైద్య పట్టభద్రులు ఎక్కువ మంది అందుబాటులో లేకపోవటం, వైద్య సిబ్బంది పోస్టులు చాలా వరకు ఖాళీగా వుండటం.... యిలా ఎన్నో వున్నాయి. కారాణాలు వున్నంత మాత్రాన అవసరాలు ఆగవ్య కదా. సమస్యలు తీరవ్య కదా.

పెట్టక పోయినా పెట్టే యిల్లు చూపించ మన్నారు పెద్దలు. ఇటు నుండి కుదరక పోతే అటునుండి నరుక్కు రావాలని నానుడి. పశుగణాలకి సంబంధించి రైతులు ఎదుర్కొనే సమస్యలను తీర్చటంలో అలాంటి ప్రయత్నాలు చాలానే జరిగాయి. ఇంకా జరుగుతున్నాయి. పదవీ వరమణ చేసిన పశువైద్య సిబ్బందిని కాంట్రాక్ట్ పద్ధతిలో పునర్నిమమించటం కొంతవరకు మంచి పరిణామమే. అక్కడితో ఆగిపోకుండా నిరుద్యోగులయిన యువకులకి, గోపాల మిత్ర, సంఘ మిత్ర, జీవ మిత్ర లాంటి పేర్లతో స్వల్ప కాలిక శిక్షణలు యిచ్చి ఆసుపత్రులు, వైద్యులు లేని గ్రామాలలో వారిని నియమిస్తున్నారు. ఆ యువకులకి అంతో యింతో స్వయం ఉపాధి లభించటమే కాక, అటు రైతులకి చేదోడుగా వుంటున్నారు. ప్రతి చిన్న ఆరోగ్య సమస్యకి మండల కేంద్రానికి పరుగులు తియ్యకుండా, కొద్దిపాటి చికిత్సలు నిర్వహించి మూగజీవాలను కూడా రక్షిస్తున్నారు.

ఆ తర్వాత రాయితీలపై పశువ్యల పంపిణీ, గడ్డి విత్తనాల పంపిణీ, గ్రాసాన్ని కోసే చీఫ్ కట్టర్‌ల పంపిణీ, సంచార వైద్య కేంద్రాల స్థాపన.... ఇలా ప్రయత్న లోపం లేకుండా పశు సంవర్ధక శాఖ ప్రశంసనీయమైన కృషి చేస్తోంది. ఎన్ని చేసినా కడలికి, కష్టాలకి అంతు కనిపించదంటారు కదా. అందుకే 'ఆదర్శ రైతులు' రంగంలోకి వచ్చారు.

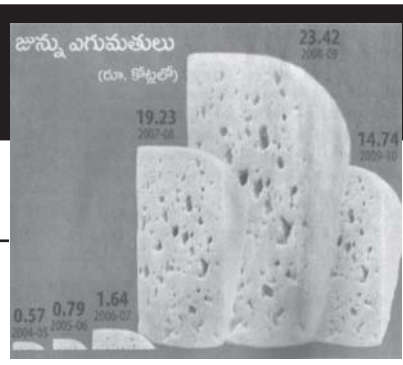
మారు మూల గ్రామాలలోని రైతు సోదరులకు ప్రాధమిక సాంకేతిక సమాచారాన్ని అంబించి, సకాలంలో తగిన నిర్ణయాలు తీసుకునే దిశగా, వారిని తీర్చి దిద్దటంలో సహకరించటానికి 'ఆదర్శ రైతు'ల ఎంపిక జరుగుతోంది. వ్యవసాయ అనుబంధ రంగాలకి చెందిన అనేక శాస్త్రీయ విషయాలను తెలయ చెప్పటానికి వారికి శిక్షణ కూడా యిస్తున్నారు. శిక్షణలో వున్న రైతులు చిత్తశుద్ధితో ఆసక్తితో, అంకిత భావంతో శిక్షణ పొందితే సాటి రైతులను తప్పకుండా ఆదుకుంటారు. ఆదర్శం అవ్వతారు.

- ఎడిటర్

దిగుబడి.. భూతాపం 'పాలు'

ఏటా నష్టం... రూ. 2,661 కోట్లు

2 శాతం దాకా తగ్గుతున్న పాల ఉత్పత్తి



ఆంధ్రప్రదేశ్ సహా పలు రాష్ట్రాలపై ప్రభావం

హైదరాబాద్ : భూతాపం (గ్లోబల్ వార్మింగ్) పాల దిగుబడిపై గణనీయంగా ప్రభావం చూపుతోంది. దీనివల్ల గత ఏడాది దేశ వ్యాప్తంగా తగ్గిన పాల ఉత్పత్తి వ్యాపారం విలువ రూ. 2,661.62 కోట్లని జాతీయ పాల పరిశోధన సంస్థ (ఎన్‌డీఆర్‌ఐ) లెక్కగట్టింది. ఆంధ్రప్రదేశ్, ఉత్తరప్రదేశ్, తమిళనాడు, రాజస్థాన్, బీహార్, హర్యానా తదితర రాష్ట్రాల్లో పాడి పశువులపై భూతాపం ప్రభావంతో నష్టాలు బాగా ఉంటున్నట్లు శాస్త్రవేత్తలు గుర్తించారు. పాల దిగుబడిపై ప్రత్యేక పరిశోధనలకు రెండు ప్రాజెక్టులను ఎన్‌డీఆర్‌ఐ చేపట్టింది. పరిశోధన ఫలితాల వివరాలు:

♦ గ్లోబల్ వార్మింగ్‌తో ఉష్ణోగ్రత - తేమ సూచిక (టీహెచ్‌ఐ)లో తేడాలు బాగా వస్తున్నాయి. దీనివల్ల పాడి పశువుల ఒత్తిడి స్థాయి పెరుగుతోంది.

♦ ఉష్ణోగ్రత హెచ్చడం వల్ల పశువుల్లో గర్భధారణ ఆలస్యం అవుతోంది. దూడలు గర్భధారణ స్థాయికి ఆలస్యంగా వస్తున్నాయి.

♦ దేశంలో గత ఏడాది 110 మిలియన్ టన్నుల పాల ఉత్పత్తి రాగా గ్లోబల్ వార్మింగ్ నష్టం 18 లక్షల టన్నుల దాకా ఉందని అంచనా.

♦ ఎక్కువగా నష్టపోతున్న రాష్ట్రాల్లో ఉత్తరప్రదేశ్, తమిళ నాడు అగ్ర స్థానాల్లో ఉన్నాయని శాస్త్రవేత్తలు గుర్తించారు. ఆంధ్రప్రదేశ్ ఆరో స్థానంలో ఉంది.

♦ భారత దేశం నుంచి జున్ను ఎగుమతులు గతంలో గణనీయంగా ఉండేవి. కానీ 2008-09లో రూ. 23.42 కోట్లతో పోలిస్తే 2009-10లో ఎగుమతులు రూ. 17.74 కోట్లకు పడిపోయాయని వాణిజ్యశాఖ తెలిపింది.

♦ పాలలో నుంచి జున్ను తీసే పాళ్ళు కూడా తగ్గుతున్నట్లు గుర్తించారు.

♦ ప్రపంచంలో 196 దేశాల్లో పాల ఉత్పత్తి జరుగుతుండగా ఇండియా అగ్రస్థానంలో ఉంది. విడివిడిగా చూస్తే... ఆవు పాలలో అమెరికా, గేదె పాలలో ఇండియాలు అగ్రస్థానాలలో ఉన్నాయి. ఆవు పాల ఉత్పత్తిలో తొలి పది ర్యాంకుల్లో ఆసియా, ఆఫ్రికా ఖండాల నుంచి కేవలం ఇండియా(2), చైనా(3) ఉండగా మిగతావన్నీ ఇతర ఖండాల దేశాలవే. కానీ గేదె పాల ఉత్పత్తిలో తొలి పది స్థానాల్లో ఇటలీ (8) తప్ప ఐరోపా, అమెరికా ఖండాల దేశాలేమీ లేకపోవడం గమనార్హం.

♦ ఆంధ్రప్రదేశ్‌లో సంప్రదాయ పాడి పశువుల సంఖ్య గణనీయంగా తగ్గిపోతుంది ముర్రా లాంటి మేలు జాతి పాడి పశువుల పెంపకానికే రైతులు మొగ్గు చూపుతున్నారు. గతంలో ఇంటికి సగటు ఉన్న నాలుగయిదు పాడి పశువులు కనిపించేవి. కానీ ఇటీవల కాలంలో ఇంటికొకటి, రెండు మాత్రమే అధిక పాల దిగుబడినిచ్చేవి కనిపిస్తున్నాయి.

♦ ఆంధ్రప్రదేశ్‌లో తలసరి పాల లభ్యత రోజుకు 299 గ్రాములు. ఈ విషయంలో దేశంలో మన రాష్ట్రం 8వ స్థానంలో ఉంది. పంజాబ్ 962 గ్రాములతో అగ్రస్థానంలో ఉంది. హర్యానా 632, రాజస్థాన్ 408, గుజరాత్ 387, హిమచల్ ప్రదేశ్ 367 గ్రాములతో తరవాతి స్థానాల్లో ఉన్నాయి.

♦ భారత దేశ జాతీయ సగటు పాల లభ్యత రోజుకు 233 గ్రాములు కాగా ప్రపంచ సగటు 267 గ్రాములు ఉంది.

♦ భారతదేశంలో రోజుకు ఒక్కో ఆవు సగటున 3.138 కిలోల పాలను ఇస్తుంటే.. ఈ విషయంలో ప్రపంచ సగటు 6.420 కిలోలని తేలింది. అలాగే ఒక్కో గేదె రోజుకు సగటున 4.379 కిలోల పాలు ఇస్తుంటే.. ప్రపంచ సగటు 4.188 మాత్రమే కావడం గమనార్హం.

♦ భూతాపం పెరిగే కొద్దీ పాడి పశువుల ఆరోగ్యంపై ప్రభావం అధికంగా కనిపిస్తోంది. దీనివల్ల పాల ఉత్పత్తి ప్రపంచ వ్యాప్తంగా తగ్గుతోందని శాస్త్రవేత్తలు గుర్తించారు. ఈ నష్టం పరిశీలిస్తే కొన్ని వేల కోట్ల రూపాయల్లో ఉంటుందని అంచనా.

- ఈనాడు సౌజన్యంతో

క్షీరదాత..... స్ఫూర్తి ప్రదాత

డా.ఎం. కోటేశ్వర రావు, వెటర్నరీ అసిస్టెంట్ సర్జన్, ప్రాంతీయ పశుసంవర్ధక శిక్షణా కేంద్రం, కరీంనగర్

నాడు ఎనిమిది ఆవులతో ప్రారంభం

నేడు లక్ష(ల) లీటర్లకు 'లీడర్'

ఆయన స్వప్నం క్షీర సాగరం

ఆయన లక్ష్యం రైతు సంక్షేమం

ఆయన సమక్షంలో పాలు పరవళ్ళు తొక్కుతాయి.

ఆయన పథకాలతో ప్రగతి పరుగులు తీస్తుంది.

ఆయనే-నేటి, మేటి, పాల సైలయోటి కాటన్ దొర...

కరీంనగర్ డైరీ ఛైర్మన్ శ్రీ చలిమెడ రాజేశ్వర్ రావు.

పుట్టింది కరీంనగర్ జిల్లా, కోనరావు పేట మండలం, మల్కపేట గ్రామం. రైతు కుటుంబం. అందుకు తగ్గట్టుగానే చదివింది కూడా వ్యవసాయ శాస్త్రం. చదువు విజ్ఞానం కోసమే కాని ఉద్యోగం కోసం కాదు అని నమ్మే అతి తక్కువ మందిలో రాజేశ్వర్ రావు కూడా ఒకరు. అందుకే, అగ్రికల్చరల్ బియ్యస్సీ చదివి కూడా, ఉద్యోగం కోసం చూడకుండా, ఆ విజ్ఞానాన్ని స్వంత వ్యవసాయానికి సాయంగా వినియోగించారు. ఈ ప్రపంచానికి రైతు వ్యవసాయంతో అన్నం పెట్టగానే సరిపోదు, కమ్మని పెరుగు కూడా తోడు అయినప్పుడే అది సంపూర్ణ ఆహారం అవుతుంది. అని భావిస్తారు ఆయన. రైతుకు పాడి-పంట రెండు కళ్ళు అనే మాటను నిజం చేస్తూ, పాడి పరిశ్రమను కూడా ప్రారంభించారు. 1980వ సంవత్సరంలో ఎనిమిది ఆవులతో పాడిని ప్రారంభించారు. ప్రారంభించగానే పాడి పరిశ్రమలోని సమస్యలు ఒక్కొక్కట్టిగా తెలిసొచ్చాయి. వెన్న శాతం సరిగా రాకపోవటం, పాలకు గిట్టు బాటు ధర లేకపోవటం, మేలు జాతి పశువులు అందుబాటులో లేకపోవటం, పశుగ్రాసాల కొరత, దాణా ధర, వ్యాధులు... వంటి అంశాలు, సమస్యల పట్ల రాజేశ్వర్‌రావుకు అనుభవపూర్వకంగా అవగాహన పెరుగుతూ వచ్చింది.

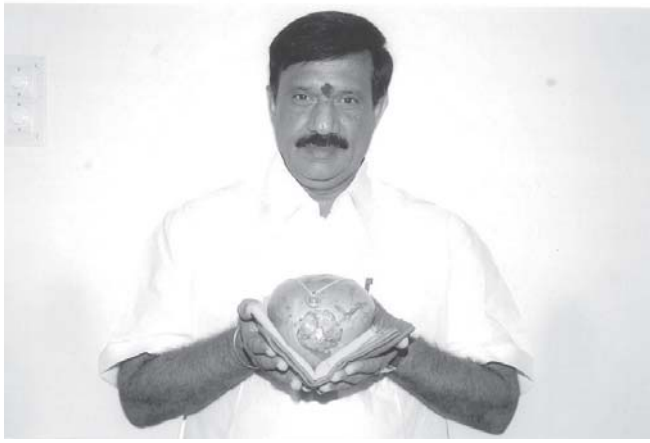
ఏదో చెయ్యాలనే తపన : పాడిలో వున్న సమస్యలను పరిష్కరించగలిగితే, పాడిలో లాభాలు పెరగటమే కాకుండా అది అనేక మందికి జీవనోపాధిని యిచ్చి ఆదుకుంటుందని రాజేశ్వర్ రావు భావించారు. సాటి రైతులకు ఏదో ఒకటి చేసి ఆదుకోవాలనే ఆలోచనలు మొదలయ్యాయి. రైతులను ఏ రకంగా ఆదుకోవాలనే అన్వేషణ మొదలయ్యింది.

నాయకత్వ లక్షణాలు : ఒక సామాన్య వ్యక్తిగా కంటే, అంతకంటే బలమైన శక్తిగా మారినప్పుడు, సాటి వారికి సహాయపడే అవకాశం పెరుగుతుంది. వ్యక్తిగతంగా తనకున్న మంచి పేరుతో 1981వ సంవత్సరంలో స్వగ్రామం మల్కపేటకు సర్పంచ్‌గా ఎన్నికయ్యారు రాజేశ్వరరావు. 14 సంవత్సరాల పాటు ఏకగ్రీవంగా సర్పంచ్‌గా కొనసాగారు. ఒక వ్యక్తి ఒక పదవిలో నిరవధికంగా 14 సంవత్సరాలు కొనసాగాలంటే, ఎంతటి సమర్ధత, ఎంత కార్య దక్షత, ఎంత ప్రజాదరణ వుండాలో వూహించుకోవచ్చు. అది రాజేశ్వర్‌రావుకు సాధ్యమయ్యింది.

వరించిన ఇతర పదవులు : 1984 సంవత్సరంలో, వేములవాడ పంచాయతి సమితి నుండి జిల్లా గ్రంధాలయ సంస్థ సభ్యుడిగా ఏకగ్రీవంగా ఎన్నికయ్యారు. 1991 వ, సంవత్సరంలో, మళ్ళీ 1993వ, సంవత్సరంలో కరీంనగర్ జిల్లా పాల ఉత్పత్తి దారుల జిల్లా అధ్యక్షుడిగా ఏకగ్రీవంగా ఎన్నికయ్యారు.

మళ్ళీ పాడి వైపు పయనం : ప్రజలకు సమాజానికి ప్రాణ ధార వంటి, ఆరోగ్య సంజీవిని వంటి సామాన్య, బడుగు రైతులకు

సంక్రాంతి ఉత్సవాల సందర్భంగా ప్రసంగిస్తున్న రాజేశ్వర్ రావు



కళ్యాణమస్తు కార్యక్రమం ప్రారంభంలో, మంగళ సూత్రాలు, మెట్టెలు, పశుపు కుంకుమలతో రాజేశ్వర్ రావు

జీవదార వంటి పాల గురించి ఆలోచించటానికి రాజేశ్వర్ రావుకు అవకాశం వచ్చింది. 1997వ, సంవత్సరంలో ఆయన తొలిసారిగా, కరీంనగర్ డైరీ చైర్మన్‌గా ఏకగ్రీవంగా ఎన్నికయ్యారు. ఒకసారి కాదు... మూడు సార్లు, మూడుసార్లూ ఏకగ్రీవమే ప్రస్తుతం ఆ పదవిలో కొనసాగుతున్నారు. పదవి ఏదైనా లక్ష్యం ఒక్కటే. అదే రైతు సంక్షేమం

రైతు సంక్షేమ కార్యక్రమాలకు శ్రీకారం : చైర్మన్‌గా పాడి రైతులకు ప్రత్యక్షంగా, సహకరించే అవకాశాన్ని రాజేశ్వర్ రావు పూర్తిగా సద్వినియోగం చేసుకున్నారనే చెప్పాలి. ఆయన ఆలోచనలలో ఎన్నెన్నో సంక్షేమ పథకాలు రూపుదిద్దుకున్నాయి. అవి ఒక్కొక్కటిగా ఆచరణలోకి వచ్చాయి. ఎందరో పాడి రైతులకు, వారి కుటుంబాలకు వరప్రసాదాలయ్యాయి. వందలు, వేల సంఖ్యలోని రైతులకు, మూగ జీవాలకు లబ్ధిని చేకూర్చాయి. అటువంటి సంక్షేమ పథకాలలో కొన్నిటిని చూద్దాం.

పాల ఉత్పత్తికి చేసిన కృషి : డైరీ చైర్మన్‌గా 1997వ సంవత్సరంలో రాజేశ్వర రావు బాధ్యతలు చేపట్టేనాటికి, పాల సేకరణ రోజుకు 12 వేల లీటర్లు, పాల అమ్మకాలు 4 వేల లీటర్లు వుండగా, అది రాజేశ్వర రావు కృషి వలన ప్రస్తుతం పాల సేకరణ, పాల సేకరణ, పాల అమ్మాకాలు రెండూ, రోజుకు లక్ష లీటర్లకు పెరిగాయి. ఈ వృద్ధిని ఎప్పటికప్పుడు కొనసాగించటానికి కృషి చేస్తున్నారు.

	2008-2009	2009-2010
పాల సేకరణ	223.94 లక్షల లీటర్లు	272.46 లక్షల లీటర్లు

పాడి రైతుల అభివృద్ధికి చేసిన కృషి

(ఎ). పాడి పశువుల కొనుగోలుకు రుణాలు

వివిధ బ్యాంకుల ద్వారా, సమితి రైతులకు, పాడి పశువుల కొనుగోలుకు రాజేశ్వర రావు రుణాలు అందచేస్తున్నారు.

	2009-2010
మంజూరు ఆయన నిధులు (3,921 మంది లబ్ధి దారులకు)	రు. 6,82,14,500లు

(బి). డైరీ ప్రాజెక్ట్‌లో ఆవు దూడల పెంపకం

సరియైన అవగాహన లేకుండా, రైతులు నేరుగా, పశువులను కొనుగోలు చేయటం ద్వారా ఉత్పన్నమయ్యే సాంకేతిక సమస్యలు లేకుండా చెయ్యటానికి, దూడల పెంపకం కార్యక్రమాన్ని చేపట్టటం జరిగింది.

పుంగనూరు, కోలార్, ఇతర ప్రాంతాల నుండి మేలు రకం సంకర జాతి దూడలను తీసుకువచ్చి, ఇక్కడి వాతావరణం, మేతకు అలవాటుపడేలా పెంచుతున్నారు. అవి యుక్త వయసుకు వచ్చాక, మేలు జాతి పోతుల వీర్యంతో చూలు కట్టిస్తున్నారు. ఈనే ముందు వాటిని వేలం ద్వారా రైతులకు విక్రయిస్తున్నారు.

ఇలా రాజేశ్వర్ రావు 102 దూడలను కొనుగోలు చేసి, పెరిగిన తరువాత వాటిలో 56 చూడి పశువులను వేలం ద్వారా విక్రయించారు.

(సి). మరణించిన పశువులకు ఆర్థిక సహాయం

సమితికి పాలు పోసే రైతుల పశువు చనిపోతే, వారికి ఆర్థిక సహాయం చేసి ఆదుకునే ప్రయత్నం చేస్తున్నారు. కొత్త పాడి పశువుల కొనుగోలుకు, ఈ ఆర్థిక సహాయం సరిపోదు అనే ఉద్దేశంతో, పరపతి సంఘం ద్వారా, ఆర్థిక సహాయంతో కలిపి, రు. 15 వేలు రుణంగా యిప్పిస్తున్నారు.

	2008-2009	2009-2010
అందించిన ఆర్థిక సహాయం	రు. 29.555 లక్షలు	26,238 లక్షలు

కార్గిల్ ఫండ్‌కు విరాళం యిచ్చిన సందర్భంగా అప్పటి రాష్ట్ర ముఖ్యమంత్రి శ్రీ నారా చంద్రబాబు నాయుడు గారితో రాజేశ్వర్ రావు

డైరీ సందర్శన సందర్భంగా రాష్ట్ర ముఖ్యమంత్రి డా. వై.ఎస్. రాజశేఖర్ రెడ్డి గారితో రాజేశ్వర్ రావు

(డి). కృత్రిమ గర్భధారణ

భారతీయ ఆగ్రో ఇండస్ట్రీస్ ఫౌండేషన్ (బేఫ్) ద్వారా, మేలు జాతి పశువుల ఉత్పత్తికి, రాజేశ్వర రావు, రైతు ముంగిట్లోనే పాడి పశువులకు కృత్రిమ గర్భధారణ సౌకర్యాలను కలిగిస్తున్నారు. 19 క్లస్టర్ల ద్వారా 394 గ్రామాలలో ఈ సౌకర్యాన్ని కలుగచేస్తున్నారు. దీని వలన రైతు పని మానుకొని దూరంగా వున్న పశు వైద్యశాలకు వెళ్ళే శ్రమ తప్పింది. పశువు నడిచి అలసిపోయే పరిస్థితి లేదు కాబట్టి చూలు కట్టే అవకాశం పెరిగింది.

పశు ఆరోగ్య సంరక్షణకు చేసిన కృషి :

(ఎ). అత్యవసర పశు వైద్య సంచార వాహనం

పాల ఉత్పత్తి దారుల పశువులకు అత్యవసర వైద్య సేవలు అందించటం ద్వారా, పశువుల మరణాలను తగ్గించి, రైతులు నష్టపోకుండా చూడటానికి , ఒక సంచార వాహనాన్ని ఏర్పాటు చేశారు ఆయన. అప్పటి రాష్ట్ర దేవాదాయ శాఖ మాత్యులు శ్రీ జువ్వాడి రత్నాకర రావు గారి ద్వారా 13.03.2008వ తేదీన ఈ వాహనాన్ని ప్రారంభింప చేశారు.

సమితికి పాలు పోసే ఏ రైతు పశువుకు అయినా, అత్యవసర చికిత్సలు అవసరం అయితే, రైతు సంఘం అధ్యక్షుడు లేదా వేతన కార్యదర్శితో ఫోన్ సమాచారం అందిస్తే, వాహనంతో పాడు ఒక డాక్టర్, ఒక సహాయకుడిని పశువు దగ్గరకు పంపి చికిత్స చేయిస్తారు. ఆ రోజుకు మందులు కూడా ఉచితంగా అందచేస్తారు. రెండవ రోజు నుండి మాత్రం మందులను రాసివ్వటం జరుగుతుంది. అందుకు రూ. 200ల నామ మాత్రపు రుసుం చెల్లించవలసి వుంటుంది.

(బి). పశువైద్య శిబిరాల నిర్వహణ

పాడి పశువులు ఆరోగ్యంగా వున్నప్పుడే, అవి సకాలంలో పెరిగి, త్వరగా ఎదకు వచ్చి, చూలు కడతాయి. పశువులు ఆరోగ్యంగా లేకపోతే, పాల దిగుబడి రాదు, కాబట్టి పశు ఆరోగ్య సంరక్షణ గురించి ఎక్కువ శ్రద్ధ తీసుకుంటున్నారు రాజేశ్వర్ రావు.

ఈ క్రమంలో, వివిధ హోదాలలోని రిటైర్డ్ వెటర్నరీ అధికారులను నియమించుకొని, సంఘంలోని రైతుల పశువులకు టీకా నిర్వహణ, వైద్య సేవలు అందిస్తున్నారు. పశు వైద్య శిబిరాలు నిర్వహిస్తున్నారు.

ఉచిత మెగా పశు వైద్య శిబిరాలు: 2009-2010 సంవత్సరంలో 58 ఉచిత మెగా పశువైద్య శిబిరాలను నిర్వహించారు. వీటి మందుల కోసం రు. లక్షా 27 వేలు వెచ్చించారు. 6,512 పశువులకు చికిత్సలు చెయ్యటం ద్వారా 5,093 మంది రైతులు లబ్ది పొందారు.

మినీ పశు వైద్య శిబిరాలు : 2009-2010 సంవత్సరంలో, 50 శాతం సబ్సిడీపై, 225 పశు వైద్య శిబిరాలను నిర్వహించారు. వీటి మందుల కోసం రు. లక్షా 55 వేలు వెచ్చించారు. 35, 285 పశువులకు చికిత్సలు చెయ్యటం ద్వారా 12, 750 మంది పాల ఉత్పత్తి దారులు లబ్ది పొందారు.

గత సంవత్సరపు కొన్ని వివరాలు

వైద్య చికిత్సలు చేసిన పశువుల సంఖ్య	**: 41,797**
వ్యాధి నిరోధక టీకాలు వేసినవి	**: 51,007**
కృత్రిమ గర్భధారణ చేసినవి	**: 22,802**
కృత్రిమ గర్భధారణ ద్వారా పుట్టిన దూడలు	**: 5,267**

సిబ్బంది: రిటైర్డ్ జె.డి-1, రిటైర్డ్ ఎ.డి-1, రిటైర్డ్ డాక్టర్లు, పారా సిబ్బంది-32.

పశు పోషణకు చేసిన కృషి

దివంగత ముఖ్యమంత్రి డా. వై.ఎస్.రాజశేఖర్‌రెడ్డితో రాజేశ్వర్ రావు

శ్రీ త్రిదండి చిన్నజీయర్ స్వామీజీతో రాజేశ్వర్ రావు

(ఎ). పశువుల దాణా సరఫరా

సమితి కర్మాగారంలో తయారు చేసిన విజయ పశువుల దాణాను, లాభాపేక్ష లేకుండా, పాల ఉత్పత్తి దారులకు సరఫరా చేస్తున్నారు రాజేశ్వర్ రావు.

రు. 950లు ధర క్వింటాలు దాణా పైన రు. 50 లు సబ్సిడీ యిచ్చి, రు. 900లకే అందిస్తున్నారు.

గత సంవత్సరం 2391.05 మెట్రిక్ టన్నుల దాణా పైన రు. 11.96 లక్షలు సబ్సిడీ ఇవ్వటం జరిగింది.

(బి). పశుగ్రాసాలు

మేలు రకపు పశు గ్రాస విత్తనాలను రైతులకు 50 శాతం రాయితీ పై అందించే ఏర్పాటు చేశారు. అంతేకాదు, బహు వార్షిక పశుగ్రాసపు మొక్కలు / కణుపులను ఉచితంగా అందిస్తున్నారు.

కో1, కో2, ఎ.పి.బి.ఎన్ వంటి పశు గ్రాసాలను 10 గుంటలలో సాగు చేసిన రైతులకు రు. 1,500లు ప్రోత్సాహకంగా యిస్తున్నారు.

ఈ విధంగా, గత సంవత్సరం 26 మందికి, రు. 33 వేలు పారితోషికంగా ఇవ్వటం జరిగింది.

పాడి రైతుల సంక్షేమానికి చేసిన కృషి

(ఎ). జనశ్రీ భీమా పథకం

పాల ఉత్పత్తి దారుల సంక్షేమంకోసం, వారిని జనశ్రీ బీమా పథకంలో చేర్పిస్తున్నారు. అలా 2009-2010వ సంవత్సరంలో 24,681 మందిని భీమా పథకంలో చేర్పించటం జరిగింది. ప్రీమియం మొత్తం రు. 425లు కాగా, అందులో రు.220లను పాల ఉత్పత్తి దారులు చెల్లించవలసి వుంటుంది. మిగిలిన రు. 205లను సమితి నుండి రాజేశ్వర్ రావు సబ్సిడీగా అందచేస్తున్నారు.

2009-2010 సంవత్సరంలో ఈ విధంగా రు. 1,04,89,425 ల ప్రిమియం మొత్తాన్ని ఎల్.ఐ.సి. వారికి చెల్లించడం జరిగింది.

(బి). విద్యార్థులకు స్కాలర్‌షిప్‌లు

పాల ఉత్పత్తి దారుల పిల్లలలో, ప్రతిభావంతులకు స్కాలర్‌షిప్‌లను యిచ్చి ప్రోత్సహించటం రాజేశ్వర్ రావు పెద్ద మనసుకు మరో తార్కాణం.

పాల శీతలీకరణ కేంద్రాల వారీగా, ఇంటర్‌లో అత్యధిక మార్కులు సాధించిన వారిలో ఇద్దరిని ఎంపిక చేసి, ప్రథమ స్థానంలో నిలిచిన విద్యార్థికి రు. 5వేలు, ద్వితీయ స్థానంలో నిలిచిన విద్యార్థికి రు. 3వేలు స్కాలర్‌షిప్‌గా యిచ్చి ప్రోత్సహిస్తున్నారు.

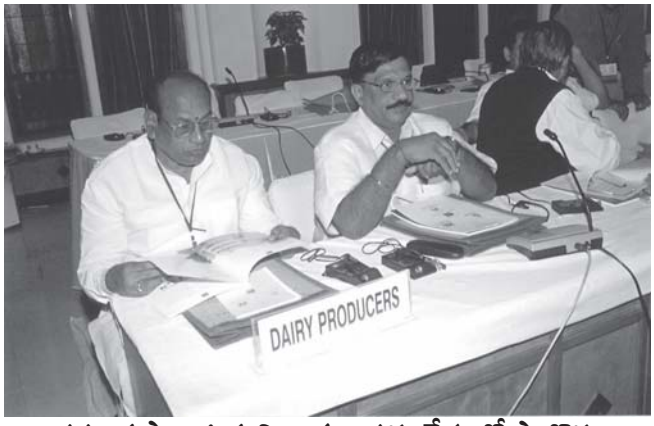
పాడి రైతులకు అందిస్తున్న వినూత్న పథకాలు

(ఎ). పాల పరీక్షా పరికరాల సరఫరా

తమ పాలలో వెన్న శాతం ఎంత వుందో, తూకం ఎంత వుందో రైతులు తమంతట తామే ముందుగా తెలుసుకున్నట్లయితే, కేంద్రాలు, సంఘాలను అనుమానించే పరిస్థితులు తలెత్తవు. పైగా వారి పాల నాణ్యతను పెంచుకొనే ప్రయత్నం చేస్తారు. ఈ ఉద్దేశంతో, ఎలక్ట్రానిక్ మిల్క్ టెస్టర్‌లను, తూకపు యంత్రాలను 25 శాతం రాయితీ పై సరఫరా చేయటం ప్రారంభించారు రాజేశ్వర్ రావు.

సరఫరా చేసిన పరికరాలు	2008-2009	2009-2010
ఎలక్ట్రానిక్ మిల్స్ టెస్టర్లు	745	899
ఎలక్ట్రానిక్ తూకపు యంత్రాలు	430	490

లోక్‌సత్తా వ్యవస్థాపకులు శ్రీ జయప్రకాష్ నారాయణ గారితో రాజేశ్వర్ రావు



ప్రపంచ పాల ఉత్పత్తి దారుల సమావేశంలో పాల్గొన్న రాజేశ్వర్ రావు

మేలు జాతి అబోతులను కొనుగోలు సందర్భంగా ఆస్ట్రేలియా పర్యటనలో ఆనాటి మంత్రి కిష్టప్ప, సి.ఇ.వో. డా. రామలింగరాజు గారితో

(బి). మరణించిన పాల ఉత్పత్తి దారుల దహన సంస్కారాలకు ఆర్థిక సహాయం : పాలు పోసే రైతు చనిపోయినా, అతని కోసం ఏదో చెయ్యాలనే ఆలోచన రావడం రాజేశ్వర్ రావుకే చెల్లింది. సహజంగా లేదా ప్రమాదవశాత్తు లేదా మరేకారణంగా అయినా, పాల ఉత్పత్తి దారులు మరణిస్తే, దహన సంస్కారాలకు గాను, మరణించిన వ్యక్తి కుటుంబానికి అదే రోజు రు. 3 వేలు చెల్లిస్తారు రాజేశ్వర్‌రావు.

ఈ విధంగా 93 మంది పాల ఉత్పత్తి దారుల కుటుంబాలకు రు. 2,79,000 సమితి ద్వారా చెల్లించి మానవత్వాన్ని చాటుకున్నారు.

(సి) కళ్యాణమస్తు కార్యక్రమం : శుభకార్యాలలోనూ రాజేశ్వర్ రావు ముందే వుంటారు. సమితికి చెందిన పాల ఉత్పత్తి దారుల కుమార్తెలకు వివాహం చేసేటప్పుడు, కళ్యాణమస్తు కార్యక్రమం ద్వారా వారికి, మంగళ సూత్రాలు, మెట్టెలు, పసుపు కుంకుమలు అందచేస్తారాయన.

అలా యింతవరకు రు. 65,77,021ల వ్యయంతో, 1,267 మంగళ సూత్రాలు, మెట్టెలు ప్రదానం చేసి, నూతన జంటలకు నూతనోత్సాహాన్ని యిచ్చారు.

పాడి రైతుల ఆహ్లాదానికి ప్రత్యేక కార్యక్రమాలు

(ఎ) సంక్రాంతి ఉత్సవాలు : పాల ఉత్పత్తి దారులు సంప్రదాయబద్ధమైన పండుగలలో, ఆహ్లాదంగా, ఆనందంగా గడపటం కోసం ఎన్నెన్నో ఉత్సవాలు నిర్వహిస్తుంటారు రాజేశ్వర్ రావు. సంక్రాంతి ఉత్సవాలలో ఆడవారికి ముగ్గుల పోటీలు, వంటల పోటీలు, మగ వారికి కబడ్డీ వంటి ఆటల పోటీలు నిర్వహించి, విజేతలకు బహుమతులిస్తూ వేడుకలు నిర్వహించి సమితి సభ్యులందర్నీ ఒక కుటుంబంలా కలిపేస్తారు.

ప్రజాహిత కార్యక్రమాలు : రాజేశ్వర్ రావు కేవలం రైతు పక్షపాతి అనుకుంటే పొరపాటే ఆయన ప్రజా పక్ష పాతి కూడా వివిధ సామాజిక సందర్భాలలో చురుకుగానే స్పందిస్తారు.

(ఎ) కార్గిల్ ఫండ్‌కు విరాళం : కార్గిల్ ఫండ్‌కు ఒక రోజు డైరీ ఆదాయం రు. 82 వేలను అప్పటి ముఖ్యమంత్రి నారా చంద్రబాబు నాయుడు గారికి 06.07.1999వ తేదీన అందచేయటం ఆయన ఔదార్యానికి నిదర్శనం.

(బి) కుటుంబ నియంత్రణకు సహకారం : తన సమితి సభ్యులకు నచ్చచెప్పి, కుటుంబ నియంత్రణలకు ఒప్పించే పనిలో కూడా సఫలం అయ్యారు.

(సి). నిరంతర అన్వేషి : రైతుకు యింకా ఏంచేస్తే లాభం చేకూరుతుందో తెలుసుకోటానికి, ఆ ప్రయత్నంలో యితరుల నుండి నేర్చుకోటానికి అధ్యనం కోసం ఇతర రాష్ట్రాలు, దేశాలు కూడా పర్యటించటం రాజేశ్వర్ రావు అలవాటు.

ఈ నిరంతర అన్వేషి, నిరంతర విద్యార్థి మరిన్ని మంచి కార్యక్రమాలతో ముందుకు వెళుతూ, భావితరాలకు మార్గదర్శి కాగలని ఆశిద్దాం.

రైతు సంక్షేమ కార్యక్రమంలో రాజేశ్వర్ రావు

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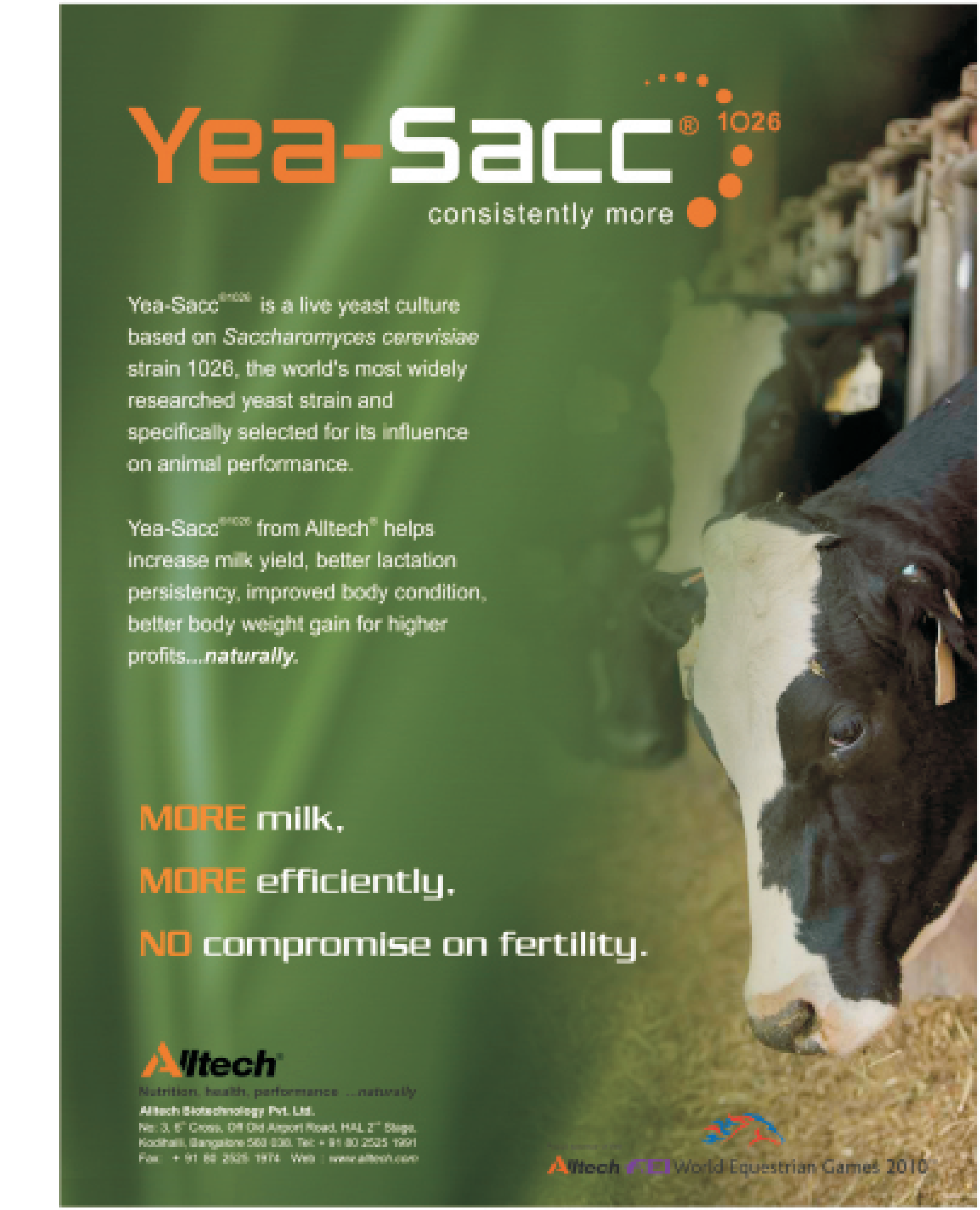

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