3

The Blue Cross Book

for the Veterinary Profession

Hoechst India Limited

Hoechst BEHRING

3 June

INCREASING BREEDING EFFICIENCY

Anoestrus condition is a bane to the Dairy Industry. Appropriate measures such as clinical examination and suitable measures for correction of the defect will go a long way in ameliorating this problem.

In this issue, a paper on use of Tonophosphan indicates encouraging signs in this direction. Even if 1% of the affected animals are benefited with this line of treatment, with millions of breedable cattle in India, the economic advantage would be incalculable

IMPROVED PRODUCTIVITY IS THE OTHER
NAME FOR PROSPERITY.

मेजर जनरल आर एन कक्कड़
अपर महानिदेशक आर वी एस
Maj Gen R N Kacker
Addl D G RVS
Tele 603832 (Off)
Tele 89-22842 (Res)

अपर महानिदेशालय रिमाउन्ट वेटेरिनरी
क्वार्टर मास्टर जनरल शाखा, सेवा मुख्यालय
वेस्ट ब्लाक ३, आर के पुरम, नई दिल्ली-११००६६
Addl Dte General Remount Veterinary
Quartermaster General's Branch
Army Headquarters
West Block 3, R K Puram
New Delhi-110066

1. It gives me great pleasure to note that publication of "The Blue Cross Book" by Hoechst India Ltd has been resumed after a lapse of almost ten years. The publication is very informative as well as of practical utility in promoting and safeguarding the health of our precious livestock and pet animals.

2. I take this opportunity to congratulate the Editorial Board and all other personnel connected with the publication of this book and extend my best wishes for its continuity, popularity and success.

3. I am confident that regular publication of this book will not only help Hoechst India to forge ahead in the pursuit of its commitment to animal health but will also be beneficial to all veterinary clinicians and academicians at large.

(RN Kacker)
Maj Gen

29 Jun 94

Rabies

is fatal hence

Candur® R VET.
(Anti-rabies Vaccine)

is vital

NOW MADE IN INDIA!

- Highly purified fibro-blast culture vaccine
- Highly potent and immunogenic
- Free from side effects

Each pack contains
1 vaccination dose of Candur® R
with solvent and syringe.

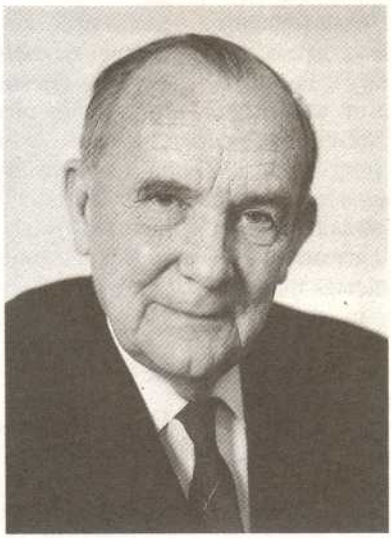
BEHRING
A Division of
Hoechst India Ltd.

Hoechst India Limited
Hoechst Centre, 54-A, Andheri Kurla Road, Andheri, Bombay-400 093

Hoechst

TRIBUTE TO A GREAT SCIENTIST

Prof. Nils Lagerlof (1895-1970)



Prof. Nils Petrus Lagerlof was born in Sunnemmo (Sweden) on 25th August 1895. He obtained his Doctorate degree in 1934, the subject being "Sperm morphology, their abberations and relation to pathological changes in testicles". His work served as a basis for prognostic aids for fertility in male animals.

Later on, he concentrated on the problem of Hereditary form of Gonadal Hypoplasia in Swedish Highland breed and successfully combated against this serious form of infertility. He had a lion's share in eradicating Brucellosis from Swedish cattle. He introduced Artificial Insemination service in the country and now Sweden is one of the foremost countries in semen utilization – neat and frozen as well as progeny testing programme.

Professor Lagerlof became the Rector of Royal Veterinary College, Stockholm from 1957 to 1962. Thereafter, he worked as Professor Emeritus since 1962. He has over 203 scientific publications in recognised journals and more than 22 advisory reports to various developing countries in respect of Veterinary education, research and Artificial Insemination.

Prof. Lagerlof was an International personality and acted as F.A.O. expert and advisor to Governments of India, Thailand, Turkey etc. as well as on various advisory committees of different Governments, as Visiting Professor to Cairo, on study tours to Scandinavian countries, and as advisor on various panels. During his wide and far travels, he has collected and preserved countless friends and followers. This was possible because of his dynamic energy, good organising capacity, charming personality, splendid art of making and maintaining friends, generosity, humane and spiritual outlook, simple and practical ways of living.

(Compiled by *Velhankar D.P.* Retd. Prof. Gynaecology and Obstetrics, Bombay Veterinary College)

Advances In The Immunology Of Larval Cestodes Of Veterinary And Public Health Importance In India.

By
Mathur P.B.
Assistant Director General,
Indian Council of Agricultural Research, New Delhi.

Larval cestodes, commonly known as bladder worms belong to the family Taenidae (Cyclophyllidea) the life-cycle of which involves two mammalian hosts. Definitive hosts are different types of carnivores (dog, cat, man) in whose intestine the adult stages reside. Intermediate hosts are herbivores and omnivores in which the larval stages (bladder worms) develop. The literature clearly indicates that the incidence of bladder worms in the farm animals is quite high in India (Veliath *et al.* 1985; Verma and Ahluwalia 1989; Shinde *et al.* 1991; Deshpande 1977; Kulkarni *et al* 1986; Gatne *et al. 1989;* Machinicka and Zwierz 1974; Mahajan *et al.* 1974 and Kwa and Liew 1977).

The most common sites of bladder worms in the hosts are lung and liver (Hydatid cyst); skeletal muscles, tongue, diaphragm and cardiac muscles (Cysticercus) and brain (Coenurus) which are the edible parts of carcass and condemnation of these infected parts leads to considerable economic loss.

In addition few of them viz., *Hydatid Cysticercus cellulosae, Cysticercus bovis* and *Coenurus cysts* have zoonotic importance. Human beings also get infected with different types of bladder worms (*Hydatid, Cysticercus cellulosae* and *Coenurus)* which may get localized in the vital organ viz., brain, liver, lung and heart and give rise to severe lesions/symptoms/disease conditions. In other words it can be said that the farm animals viz. cattle, sheep, goats and pigs indirectly act as a source of infection for human cases. In human beings also the incidence of bladder worm infections is increasing gradually and now-a-days *Hydatid* and *Cysticercus cellulosae* cysts are recognised as the most important parasitic zoonoses.

Life cycle:

The life-cycle of Taeniid tapeworms are relatively simple and quite similar. The adult tapeworms are obligate parasites of the human/canivore intestines and not found in the adult form in any other species of animal in nature. The adult worms produce gravid segments which leave the human/carnivore host in the intestinal tract. If gravid segments or eggs are ingested by a suitable intermediate host, the eggs hatch and eventually become larval tapeworm in the muscles or organ of that animal. The cycle is completed when a final host ingests these cysts in the flesh of an intermediate host.

The larval cysticerci are considerably less host-specific than the adult worms and may be found in a variety of intermediate hosts. Domestic cattle are the usual intermediate hosts, for the cysticerci of *T. saginate,* the pig is the usual intermediate host for the larval stage of *T. solium* but cysticerci have been reported in man and other primates.

Echinococcosis and hydatidosis are terms usually applied inter-changeably to the zoonotic infections caused by the adult and larval stages (metacestodes) of *Echinococcus granulosus.* The adult is found in the intestine of dogs and gravid segments or free eggs, are passed in the faeces of the dogs. The intermediate host represented by a wide range of mammals, including man, acquires infection by the ingestion of eggs.

Coenurus cerebralis is a disease of great economic importance for the sheep industry. The author has observed frequent deaths due to this infection. In farm animals where dogs were not kept away from sheep, the incidence was considerably higher.

Bladder worm infections cannot be diagnosed by conventional parasitological techniques. Further, there are no reliable immuno-diagnosis tests evolved so far for detection of the infections in live animals. However, considerable progress has been made regarding diag-

nosis of bladder worm infections in human beings. With the advent of newer anthelmintics such as Albendazole and Praziquantel which have cidal action on bladder worms (Soulsby, 1982), the detection and treatment of farm animals prior to slaughter would emerge as a policy to control and eradicate bladder worm infections which will minimise slaughter house condemnation. Hence species specific serodiagnostic methods are required to select the animals for slaughter.

Immunological response in the definitive host:

Evidence from experimental and natural infections with adult tapeworms has shown that specific antibody responses do occur and immunologically mediated effector mechanisms contribute to the outcome of host parasite interaction in the gut. Skin-sensitized antibodies have been described in dogs naturally infected with *Echinococcus granulosus* (Williams and Perez-Esandi, 1971) and haemaglutinating antibodies were present in sera samples examined by Machinicka & Zweirz (1974) from human patients infected with *Taenia saginata.*

On other hand, the role that circulating antibodies play in regulating tapeworm growth or rejection is not clear, because there has been no successful demonstration of passive transfer of protection with serum. An immunological effector mechanism manifested by destrobilation and rejection of adult worms has been proposed by Hopkins *et al.* (1972) to account for their findings on *H. diminuta* infection in mice. Herd *et al.* (1975) reported successful immunization with the antigens secreted by adult *E. granulosus* and found that parasites growing in immunized dogs had suppressed egg production and reduced number of proglottids. On the basis of these observations it may be concluded that immunological systems operate in the definitive host to limit the successful establishment of adult cestodes.

Immunological responses in intermediate hosts:

Epidemiological studies on naturally occurring cysticirocosis in domesticated ruminants have implicated acquired immunity as an important determinant of the pattern of infection in animal population. This has been proved in many experiments of protective responses to challenge infection with *T. saginata* in cattle (Urqurart 1961)and *T. ovis* and *T. hydatigena* in sheep (Geninell *et al.* 1969) and artificial immunization of pigs against *T. solium* which involved parenteral inoculation of activated oncospheres (Pathak and Gaur, 1992). Killed organisms or antigenic extracts were consistently ineffective, giving rise to conclusion that immunity was stimulated only by the presence of live parasites in tissues. Some remarkable progress has been made in this field in the last few years and the results offer promises of development of vaccination for cattle and sheep in future.

Passive transfer of immunity against *T. hydatigena* was first achieved by Blundell (1969) and later colostral transmission of protection from ewes to lamb was shown to occur in the case of both *T. hydatigena* and *T. ovis* (Rickard and Arundel, 1974). However, Rickard and Bell (1971) were able to prove a high degree of resistance to *T. ovis* in lambs by implanting intraperitoneal diffusion chambers containing activated oncospheres and by vaccination with antigens collected from 14 days *in vitro* culture of embryos of *T. ovis.* Rickard and Bell, (1971) demonstrataed that vaccination of 4 month old lamb with these *in vitro* culture antigens resulted in immunity to high levels of challenge with *T. ovis* from experimentally contaminated postures. Single vaccinations resulted in resistance to challenge upto 12 months later.

The mechanism of resistance in vaccinated animals is not known. One consistent observation is the naturally or artificially induced immune mechanism is incapable of causing destruction of mature metacestodes which are already established in the body of the host due to primary infection. However, succeeding infections fail to establish. Hammerberg and Williams (1978 a and b) explained that the secretory products of a mature metacestode contain a poly sulphoited proteoglycan which depletes haemolytic compliment (C_3) from its immediate vicinity thus protecting it from compliment mediated antibody attack.

Serological diagnosis:

The intermediate host is exposed successively to antigenic stimuli of the invading oncosphere, the metacestode in transformation from oncospheres and finally the mature metacestode (Bladder worm) However, material from only developed bladder worms have been exploited for immunodiagnostic work. Among the cyst components which have been tested for their antigenecity are the protoscolices, cyst membrane and cystic fluid (Kegan and Norman 1961; Biguet *et al* 1962; Dottorini and Tassi, 1977). These materials contain multiple antigenic components and most of them share reactivity not only with other helminths but also with other disease conditions (Russi *et al.* 1974; Ben-Ismail *et al.* 1980). Those shared antigens are responsible for problems of nonspecificity in the serodiagnosis of bladder worm infection. Now a days the research in this field is mostly directed towards the identification and isolation of monospecific antigens which may give 100% specific reaction.

Capren *et al.* (1967) have successfully identified and isolated antigen-5 from Hydatid fluid. They have further stated that demonstration of serum antibodies to this antigen is diagnostic for hydatidosis. Subsequently, the diagnostic importance of Antigen-5 has been confirmed by numerous workers (Yarzabal *et al.* 1974; Varela Diaz *et al.* 1974 & 1975; and Marcos Cidera *et al.* 1984) who have reported hydatid specific (Arc-5) antigen by using IEP. Schantz and Kagan (1980) reported (Antigen-5) from fertile as well as sterile hydatid cysts in all the animals. Bout *et al.* (1974) purified and studied antigenic characters of (Antigen-5) and showed that is a thermolabile lipoprotein substance of 60,000 daltons mol. weight. However, no such antigens have been identified so far from other bladder worms which can help in detecting all the cases of the bladder worms with 100% efficacy. Gatne and Narsapur (1990) reported that the protein content of HF ranged from 16 to 122 mg%. SDS-PAGE of HF from different types and locations revealed 11 components of proteins with wide range of molecular weights. Immunoelectrophoretic studies of HF samples of different types showed presence of 'Arc 5' antigen.

Immunodiagnostic studies using Double Diffusion and Scolex Precipitation tests revealed that combined use of the two tests offered diagnosis of 85% known positive cases as against 75% by DD and 81% by SP test. The DD test was found to be more efficient in detecting multiple organ infection followed by hepatic and pulmonary cases. However, no such difference was noted in SP test (Gatne and Narsapur 1990).

As regards *Cysticercus cellulosae* from pigs Shinde, *et al* 1991 reported that scolex antigen which contained 16 fractions of structural proteins and three of secretory proteins was superior to cystic fluid antigen and whole cyst antigen. Indirect haemagglutination test using scolex antigen showed 84% efficacy in detecting positive cases.

As regards Cysticercosis and hydatidosis in human beings radiology and scanning techniques have been used more effectively for diagnosis in addition to ELISA with purified antigens.

General conclusions:

In spite of the great differences among the various host-parasite relationship of the cestodes and the different experimental designs that have been used for their study, the following general conclusions and considerations would appear to be appropriate :

1) It is possible to induce a state of resistance to metacestode infections by means of immunization but as with other vaccines, the degree of resistance varies in the fraction of vaccinated animals that develop it, and varies in the number of parasites that become established after challenge.

2) That the induced resistance is at least partly due to the presence of antibodies has been clearly established by means of successful natural and experimental passive transfer of resistance with immune serum, colostrum and immunoglobulins.

3) The antigens characteristic of each developmental stage of the parasite have still not been identified and their relation to immunity has still not been established with the recent development in molecular biology and DNA, hybridization, it is possible to characterise the

antigens of metacestodes. Western-blothing techniques developed for the antigen detection in hosts would lead to accurate diagnosis of bladder worms in man and animals.

References :

Ben-Ismail, R.; Carme C.; Neil, G. and Gentilini, M. (1980) Am. J. Trop. Med. Hyg. 52, 625-650

Biguet, J.; Capron, A.; Tran Van Ky, P. and Haussy, R. (1962) Academic des Sciences 254, 3600-3602 (Cited from Schantz and Kagan, 1980)

Blundell Hassel S.K. (1969) Aus. Vet. 45, 334-341

Bout, D.; Fruit, J. and Capron, A. (1974) Annale de Immunologic 125, 775-788 (Herminthological Abst, 48, Abst. No 4066)

Caoron, A.; Vermes, A. and Biguet, J. (1967) Pract. methods clin Immunol 2, 119

Deshpande, M.S. (1977) Mahavet 111(2), 35-39

Dottorini, S. and Tassi, C. (1977) Exp. Parasitol 43, 307-314

Gatne, M.L. and Narsapur, V.S. (1990) Indian Vet. Jour. 67, 169-170

Gatne, M.L. ; Narsapur, V.S.; Niphadkar, S.M. and Deshpande, V.S. (1989) J. Maharashtra Agril. Univ. 14(3), 389.

Hammerberg, B and Williams J.S. (1978a) J. Immunol, 1207, 1033-1038

Hammerberg, B and Williams J.S. (1978b) J. Immunol, 1207, 1039-1045

Herd, R.D.; Chappell, R.J. and Biddell, D. (1975) International Parasitol 5, 395-399

Hopkins, C.A.G.; Subramanian, S. and Stallard, d. (1972) Parasitol 64, 401-412

Kagan, I.G.; and Norman, L. (1961) Am. J. Tropical Med. and Hygiene 10, 727-734

Kulkarni, D.; Muralidharan, S.R.G.; Mahendar, M. and Rao V.M. (1986) Livestock Advisor 11, 37-40

Kwa, B.H. and Liew, F.Y. (1977) Korea Univ. Med. 12, 487-493

Machinicka, B. and Zweirz, C. (1974) Serie des Sciences Biologiques 32, 259-261 (Cited from Schantz and Kagan, 1980)

Mahajan, R.C.; Chitkara, N.L.; Chopra, J.S. (1974) Indian J. Med. Res., 62(9) 1310-1313

Marcos Cidera, C.; Torres Rodriques, I.M. and Amoral Olivera, M.(1984) Revista Iberica de Parasitologia 44, 253-263 (Helm. Abstr. 54, Abstr., No. 3493)

Pathak, K.M.I.; and Gaur, S.N.S. (1992) Vet. Parasitol 57, 571-375

Rickard, M.D. and Arundel J. H. (1974) Austr. Vet. 50, 22-44

Rickard, M.D. and Bell, K.J. (1971) Res. Vet. Sci. 12, 401-402

Russi, S.; Siracusano, A. and Vicari, G. (1974) Journal of Immunology 112, 1061-1069

Schantz P.M. and Kagan, I.G. (1980) Pract. Methods Clin. Immuno. Series 2, 104-129

Shinde, M.V.; Narsapur, V.S.; and Gatne, M.L. (1991) Vidyapeeth, Dapoli, (Maharashtra)

Soulsby, E.J.L. (1982) In "Helminths Arthropods and Protozoa of domesticated animals" 7th Edn. P 120 ELBS and Baillire Tindall, London

Urqurart, G.M. (1961) P. 47, 857-869

Varela, Diaz, V.M.; Coltorti, E.A.; Recordes, M.J.; Guisantes, J.A. and Yarzabal, L.A. (1974) Am. J. Trop. Med Hyg 23, 1092-1096

Varela, Diaz, V.M.; Guisantes, J.A.; Recordes, M.J. Yarzabal, L.M. and Cottorti, E.A. (1975) Am. J. Trop. Med. Hyg. 24, 298-303

Verma, T.K.; and Ahluwalia, S.S. (1989) Indian Vet. J 66(7), 673-674

Veliath, A.J.; Ratnakar, Co. and Thakur, L.C. (1985) J. of Trop. Med. Hyg. 88(1), 25-29

Williams, J.F. and Perez, Esandi (1971) Immunol. 20, 451-455

Yarzabal, L.A.; Leiton, J. and Lopez-Lemes, M.H. (1974) Am. J. Trop. Med. Hyg 23, 662-666.

A Report On Epidemic Of Infectious Bursal Disease Of Poultry In India – An Update

Sreenivas Gowda R.N.
Professor and Head
Department of Pathology, Veterinary College, U.A.S., Bangalore

Introduction

Infectious Bursal Disease (IBD) of poultry is also known as Gumboro disease named after a place from Delaware, USA, during its first report in the year 1962 (Cosgrove, 1962). Since then there are records of this disease world wide from all major poultry producing areas including India.

IBD Research in India

a) Incidence

The incidence of Infectious Bursal Disease (IBD) was first reported from UP (Mohanty *et al.*, 1971). The serological evidence for presence of IBD virus from Tamilnadu to Kashmir was made by Jayaramaiah and Mallik, (1975) later in different states. Serodiagnosis of IBD indicated 20.9% infection in 13 of the 23 states screened for the infection (Panisup et al., 1987).

b) Identification of the virus

Although transmission experiments of Mohanty *et al.* (1971) proved the infectious nature of the disease, the viral isolation were attempted by Jayaramaiah and Mallick in 1974 and Rao *et al.*, in 1979 in chick embryo and tissue culture. Singh and Dhawadekar (1992) studied the growth characteristics of 5 different strains of IBDV in cell culture.

c) Immunosuppressive effect of IBD

Ajinkya et al. (1980), Sreenivas Gowda et al. (1986), Jhala *et al.* (1990) and Rao and Rao (1990) reported breakdown of immunity against Ranikhet disease possibly by knocking out bursal tissue by IBD.

d) Diagnosis

The diagnostic techniques such as AGID, immuno-histochemistry and immunoperoxidase (Somavanshi *et al.*, 1991 & 1992, Kumar and Rao, 1992), double sandwich ELISA (Kumar and Rao, 1991) and an indirect ELISA (Kumar *et al.*, 1991) have been widely used to detect IBD virus in bursal infection. Fluorescent antibody technique has also been tried by Dhinkar Raj et al. (1992) and Kumar and Rao. (1991c).

Etiology

IBD is caused by infectious bursal disease virus, a double shrouded RNA virus belonging to Avi Birnaviridae family, the virus with segment genome making the type of virus prone to genetic change and form into virulent types and resistant to environmental factors.

Epidemiology

Although IBD has been recorded in India from 1970s, only sporadic incidences have been reported from poultry growing areas. During August and September, 1992, the disease was reported to spread from Nepal and down to Eastern parts of Bangladesh and West Bengal. From there, it has spread to parts of Andhra Pradesh and Namakkal, the egg bowl of India, where there are 6,500 farms containing about 12.5 million birds, leading to high casualties in flocks aged between 3 to 12 weeks of age. The disease caused mortality ranging from 71.27 to 96.42 per cent in the affected farms.

In April of the same year, the occurrence of disease with heavy mortality has been recorded from Bangalore. The mortality ranged between 35 to 85 per cent in commercial layer chicks in the age group of 4 to 16 weeks, whereas in the broiler, the mortality was 8 to 15 per cent in the age group of four to six weeks old birds.

The spread of disease was also recorded in Pune belt during the months of July and August, 1993 with heavy casualties.

Disease pattern

Unlike earlier outbreaks, the disease has spread widely with more pathogenomic lesions indicating invasive or highly pathogenic virus (VVIBDV serotype-1), which has been confirmed by Central Veterinary Laboratory

Weybridge UK.

The clinical signs included severe depression, whitish diarrhoea, ruffled feathers, tremors and dehydration.

The gross pathological changes consisted of massive haemorrhages of the musculature specially on the keel and the thymus, haemorrhages at the proventricular gizzard junction, severe nephritis, enlarged edematous bursa with yellowish fluid or in the later stages. presence of caseous mass in the folds of the bursa.

The histopathology of bursa showed lymphocytolysis, sparse cellularity, congestion of blood vessels, follicular and epithelial cysts of varying sizes, interfollicular edema and interfollicular connective tissue proliferation.

Disease investigation

The investigators in the south comprised of scientist from Tamilnadu Veterinary and Animal Science University, Madras; Veterinary College, Namakkal; Institute of Veterinary Preventive Medicine, Ranipet; and Department of Pathology and Microbiology, Veterinary College, Bangalore.

The scientists visited several farms in Namakkal and Bangalore and interacted with each other and there was major agreement in their finding. The necropsies and laboratory examination of clinical samples confirmed IBD as the prime cause but there were incidences with the multiple infection such as RD, IBH and pasteurellosis.

Evaluation of IBD infection was primarily based on the detection of antigen by AGP technique. The severity of the disease was adjudged by analysis of gross pathomorphological features of involvement of various organs including hypertrophy and haemorrhagic changes in the musculature and gizzard-proventricular junction. The disease was further confirmed by histopathological evaluation.

The disease occurred mainly in the age group of 5-12 weeks and attributed to be caused by highly virulent (invasive and lethal) strains against which current vaccines were ineffective. In some instances the disease was noticed even in 16th to 17th week aged birds also.

Isolation of virus and serotyping

The isolation of virus from bursal suspension collected from Namakkal and Bangalore was attempted and the material was further sent for confirmation to the Central Veterinary Laboratory, Weybridge, Surrey, UK. According to them the virus is of standard serotype-1 of IBD, the 52/72 strain.

Hypothesis for excessive mortality

Based on the diagnosis made and report of Central Veterinary Laboratory, Surrey, UK, the IBD virus is of a very virulent type that causes heavy mortality even among vaccinated groups.

The other predisposing causes such as mycotoxins, presence of inclusion body hepatitis (IBH) and other respiratory viruses were responsible for aggravating the condition. The evidence and rate of chicken anaemia agent is yet to be established by serological and virological techniques.

The role of maternal antibodies

Analysis of maternal antibodies from day old to 21 days chicks from several sources showed irregular and ununiform levels by ELISA technique.

Strategic plan to control the disease

1. It is pertinent to conduct a critical study of the maternal antibody status of the breeding flock and its progeny in determining the time to vaccinate the chicks.

2. Provision of clean brooding environment with IBD free area.

3. Development of combined vaccines such as MD, IBD, RD, IB, etc.

4. In high risk area, use of invasive or intermediate type of vaccine is helpful.

5. The breeder flock should be vaccinated at least twice with killed vaccine before the flock starts production to ensure good maternal antibody levels to chick with sufficient production. The breeders are likely to loose their IBD antibody titres as they grow older. To ensure this it is essential to revaccinate them at 45th week of age with killed vaccine.

6. The flock should be maintained with 'all in-all out' system with good interbatch clean outs.

7. A good biosecurity system to regulate and control the movement of visitors, salesmen, cull-bird and egg collection vans, used gunny bags, egg trays and recycling of old gunny bags.

should be discontinued.

8. A proper disposal of litter debris and dead birds either by compost or burying or burning.

9. Strict adherence of vaccination schedule for both broilers and layers, a must.

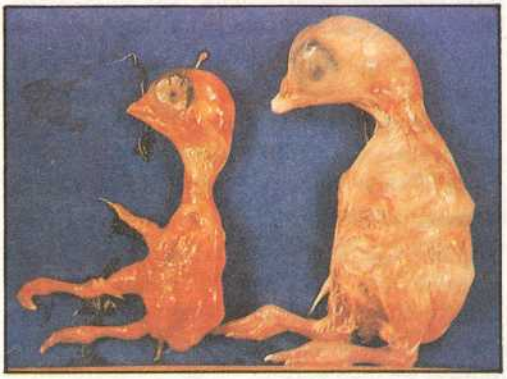
10. Training of field Veterinarians in rapid diagnosis of emerging problems.

11. Screening of samples and surveillance of field viruses with reference to their antigenicity and pathogenicity.

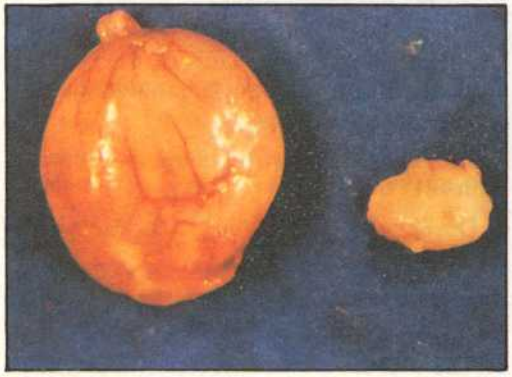
12. Training of farmers for improved management and sanitary procedures.

Lesion of Infectious Bursal Disease

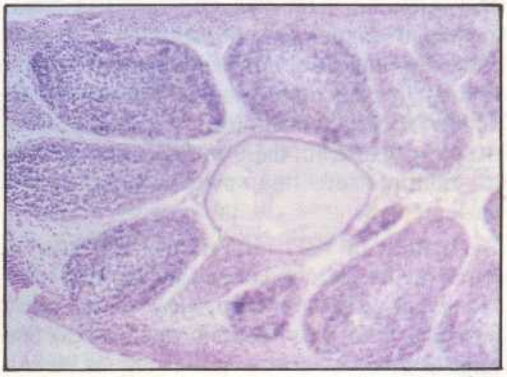
Muscular Haemorrhages



Embryo Dwarfing



Bursa Fabricius



Lymphoid Necrosis

References

Ajinkya, S.M. Survashe, B.D. and Sardeshpande, P.D. (1980). Indian Vet. J., **47**: 265-269.

Balachandran, C., Murlimanohar, B., Sunderaraj, A. and Tahanikachalam, M. (1991). Indian Vet. J., **68**(8): 718-720.

Chauhan, H.V.S., Jha, G.J., Singh, M.P. and Thakur, H.N. (1980). Indian J. Poult. Sci., **15**: 243-258.

Chetty, M.S. (1975) (Vet.) Thesis, Andhra Pradesh Agric. Univ., Hyderabad.

Cosgrove, A.S. (1962) Avian Dis., **6**: 385-389.

Dash, BB., Verma, K.C., Panisup, A.S. and Kataria, J.M. (1991) Indian J. Vet. Pathol. **15**(1): 21-25.

Dhinkar Raj, G., Thagavelu, A., Nachimuthu, K. and Venugopalan A.T. (1992) Indian J. Animal Sc. **62**: 418-419.

Dongaonkar, V.D., Kolte, G.N. and Rao, K.N. (1979). Indian Vet. J., **56**(7): 541-545.

Ganesan, P.I., Appaji Rao, V.N., Karunakaran, K., Elankumaran, S., Ramakrishna, J., Gunaseelan, L. and Raghavan, N. (1990). Cherion **19**(5): 205-208.

Jayaramaiah, B. and Mallick, B.B. (1974). Indian J. Anim. Hlth., **13**: 99-103.

Jhala, M.K., Kher, H.N. and Prajapati, K.S. (1990). Indian J. Anim. Sci., **60**(11): 1309-1310.

Jhala, M.K., Kher, H.N. and Chaudhari, H.M. (1990). Ind. J. Anim. Sci. **60**(9): 1065-1066.

Kumar, S., Kulshreshtha, R.C. and Kaushik, R.K. (1984). Harayana Veterinarian, **23**(2): 118-120.

Kumar, A. and Rao, A.T. (1991). British Vet. J. **147**(3): 251-255.

Kumar, A. and Rao, A.T. (1991a) Orissa Vet. J. **16**(3): 66-71.

Kumar, A. and Rao, A.T. (1991b). Indian Vet. J **68**(11): 1012-1014.

Kumar, A. and Rao, A.T. (1991c). Indian J. Vet. Pathol. **15**(1) 26-29.

Kumar, A., Rao, A.T. and Parhi, N.K. (1991). Indian Vet J. **68**(12): 1109-1112.

Kumar, A. and Rao, A.T. (1992). Indian Vet. J. **69**: 176-177.

Mohanty, G.C. Pandey, A.P. and Rajya, B.S. (1971). Curr. Sci., **40**: 181-184.

Mishra, P.C. (1987). Indian J. Vet. Pathol. **11**: 76-77.

Mohanty, A.K., and Rao A.T. (1984). Ind. Jour. of Poultry Sci. **19**: 210-213.

Nachimuthy, K., Raj, G.D., Thangavelu, A., Koteswaran, A., Palaniswamy, K.S. and Venugopalan, A.T. (1993). Indian Vet. J., **70**: 100-103.

Panisup, A.S., Verma, K.C. and Mohanty, G.C. (1984). Acta Vet. Scandinavica. **25**(4): 561-566 (Poultry Abstr. 111(10): 2021).

Panisup, A.S., Verma, K.C., Kataria, J.M., Singh, S.D. and Mohanty, G.C. (1987). Indian J. Poultry Sci. **22**: 245-250.

Panisup, A.S., Jarplid, B., Verma, K.C. and Mohanty, G.C. (1988). Acta. Vet. Scand. **29**(1): 125-27.

Prajapathi, K.S. and Jalnapurkar, B.V. (1981). Indian J. Poultry Sci. **16**: 102-107.

Purushothaman, V., Panneerselvam, S., Venugopal, K. and Thangaraj, T.M. (1988) Cherion, **17**: 6.

Rajeshwar, J.J. and Chandra Mohan, C.P. (1992). Indian Vet. J. **69**: 867-868.

Ray, D.K., Bhowmik, M.K. and Sarkar, P. (1985). Indian J. Poultry Sci. **20**(4): 249-250.

Rao, S.U., Sambamurthy, B. and Mallick, B.B. (1978). Indian J. Anim. Sci., **48**(4): 294-300.

Rao, V.N. and Rao, K.N.P. (1992). Indian Vet. J **69**(8): 686-689.

Sah, R.I.., Kataria, J.M., Arya, S.C. and Verma, K.C. (1988). Indian J. Vet. Pathol. **12**: 42-48.

Satyanarayana, M.L. (1986). M.V.Sc., Thesis, Univ. Agric. Sci., Bangalore.

Satyanarayana, M.L., Sreenivas Gowda, R.N.,Vijayasarathi, S.K. and Seshadri, S.J. (1993). Poultry Advisor. **24**(7): 21-24.

Singh, L.D.K. (1988). Indian J. Vet. Pathol. **12**: 110-111.

Singh, L.D.K. and Rao, A.T. (1988). Indian J. Anim. Sci., **58**(5): 589-593.

Singh, K.C.P. and Dhawedkar, R.G. (1992). Indian J. Virol. **8**(1): 15-17.

Sreenivas Gowda, R.N., Sathyanarayana, M.L. and Seshadri, S.J. (1986). Paper presented at National Symposium on Immune Deficiencies and Emerging Diseases of Animal and Birds. Bombay Vet. College, Bombay.

Sreenivas Gowda, R.N., Sathyanarayana, M.L. and Seshadri, S.J. (1988). Paper read at second Asian/Pacific Poultry Health Conference, Australia.

Somavanshi, R., Mohanty, G.C. and Kataria, J.M. (1991). Indian J. Anim. Sci., **61**(7): 665-670.

Somavanshi, R., Mohanty, G.C., Verma, K.C. and Kataria, J.M. (1992). Indian Vet. Med. J. **16**(1): 11-17.

Valsala, K.V., Nair, M.G., Varghese, K. and Rajan, A. (1988). Kerala J. Vet. Sci., **19**(2): 60-65.

Verma, K.C., Panisup, A.S., Mohanty, G.C. and Reddy, B.D., (1981). Indian J. Poult. Sci., **16**: 385-392.

Verma, R., Kharole, M.U., Kulshreshtha, R.C. and Chandiramani, N.K. (1932). Indian J. Anim. Sci., **52**(9): 847-849.

Verma, N.D., Sharma, D. and Ghosh, S.S. (1989). Indian J. Anim. Sci., **59**(3): 362-364.

Vijayan, N. Valsala, K.V., Manamohan, C.B., Varghese, K. and Nair, M.G. (1989). Kerala J. Vet. Sci., **20**(2): 139-143.

Studies On The Effect Of Tonophosphan In The Treatment Of Anoestrus In Cattle.

Pradhan, N.R.
Faculty of Veterinary and Animal Science
Bidhan Chandra Krishi Viswavidyalaya
Mohanpur, Nadia, West Bengal.

Anoestrus is a common problem in heifers and cows in dairy farms. It generally occurs due to endocrine imbalance, impaired development of sex organs, persistent corpus luteum, uterine pathological conditions and poor nutritional status.

Therefore considering the importance of phosphorus in the infertility cases, some infertile heifers & cows were selected in this study & the efficacy of "Tonophosphan", a parenteral phosphorus preparation of M/s. Hoechst India Ltd., was assessed in those cases.

Materials & Methods

For this study, 28 indigenous, crossbred Jersey and crossbred Holstein anoestrus heifers & cows of the surrounding areas of Mohanpur Veterinary Hospital of Bidhan Chandra Krishi Viswavidyalaya were selected. Heifers of more than 3 to 4 yrs of age with no history of oestrus and cows with no history of oestrus over 1 to $1^1/_2$ yrs after parturition were considered for this study. Infertility due to repeat breeding were not considered in this study.

The selected animals were examined for general health condition. Their reproductive organs were also examined thoroughly, faecal samples of these cases were examined for the detection of parasitic ova, the nematode infested cases were treated with Panacur while the trematode infested cases were treated with Tolzan-F as per their recommended dosage. 5 ml. of blood was then collected from each of these anoestrus animals and also from another 10 healthy cows and heifers with normal oestrus (Gr. A) for the collection of serum for estimation of inorganic phosphorus level in blood (Fiske and Subba Row, 1925).

The animals with the history of anoestrus were divided in 2 groups. Animals of Gr. 'B' (8 Nos.) were kept as untreated control while the animals of Gr. 'C' (20 Nos.) were treated with, Tonophosphan, @ 10 ml. intramuscularly on alternate days for 3 occasions. This treatment was repeated in some cases when needed.

Development of the clinical signs and genital organs were noted and the statistical analysis of the data was done as per Snedecor & Cochran (1967).

Results and Discussion

The clinical signs of these anoestrus heifers and cows noted were poor health, rough body coat, depraved appetite, weakness etc. and were in conformity with the observations of Morrow (1969) and Aminudeen et al. (1984) in phosphorus deficient cows and heifers. On rectal palpation the anoestrus heifers showed genital hypoplasia. The body of the uterus & its horns were under-developed. The ovaries were also very small in size. In post parturient anoestrus cows, some cows had small ovaries but in most cases the ovaries were of normal shape & size without having any developing follicle. They were also soft and pliable. These findings are in agreement with the observations of Samad (1980) in anoestrus heifers & cows. However in the control group with the animals of normal oestrus, they showed good health and normal appetite and no abnormality of the genital organs.

The mean inorganic phosphorus level in the healthy control animals (Gr. A) was 5.31 ± 0.29 mg%. In the animals of Gr. C (treated group) and Gr. B (untreated control group), the same levels were 2.02 ± 0.10 mg% and 1.99 ± 0.13 mg% respectively which were significantly lower ($P<0.01$) than the healthy control group (Gr. A). These findings corroborated the findings of Samad *et al.* (1980), Aminudeen et al (1984), Dutta *et al* (1991) and Ali *et al* (1991) who noticed the similar observations of inorganic phosphorus deficiency in the sera of infertile cattle. Roberts (1971) and Aminudeen et al (1984) remarked, the phosphorus level below 3 mg% indicate its deficiency when the

cattle develop the signs of the deficiency.

The decreased inorganic phosphorus level in the blood of anoestrus cattle was probably due to ingestion of local poor quality feed stuffs and insufficient grain rations. Samanta (1992) opined, dropped phosphorus level in anoestrus cattle might be due to high temperature & heavy rainfall which influences mineral deficiency in forages. It has also been reported that mild deficiency of Phosphorus in the diet does not significantly reduce the serum inorganic phosphorus level as it may be replaced from the skeletal reserves, but extreme malnutrition may result in exhaustion of skeletal reserves & leads to hypophosphataemia (Aminudeen et. al. 1984). (Roberts 1971) has opined that, in phosphorus deficient areas cows had calves only every 2 years and heifers failed to show estrum until over 2 years of age. These conditions are most severe in late winter and spring and after a dry summer and fall. He has also opined that some cows may have one or two periods of estrum after calving and if they failed to conceive may not show estrum until the end of lactation period. Silent or irregular estrus may be evident in heifers. This is further substantiated with the findings of Morrow, (1969) that decreased blood phosphorus level induces non-fertile oestrus which is probably due to ovulation defects. Kumar & Sharma (1991) remarked that deficiency of phosphorus retards the ovarian activity which is due to disturbance of pituitary ovarian axis when Roberts *(loc. cit)* has opioned, deficiency of phosphorus, cobalt, iron etc. suppress the secretion of the gonadotrophic hormones by the pituitary. According to Morrow (1969), phosphorus deficiency has an adverse effect on the conversion of carotene to Vit. A. which has also an important role in normal reproductive functions of the animals (Roberts, 1971).

According to Foley, (1952), phosphorus is necessary for energy metabolism of the body. It is also thought to play a key role in the transfer and utilisation of energy and successful completion of many important metabolic reactions depending on phosphorylation (Morrow, 1969).

Following treatment with Tonophosphan in the anoestrus heifers and cows of Gr. C, 13 animals (65%) showed signs of oestrus within 2 months of initiation of treatment. In the rest of animals, treatment was repeated again after 2 months. Out of these six animals, 2 animals (10%) came in heat within one and half month while the remaining five animals did not show any signs of oestrus. Out of these 15 animals 14 became pregnant with 1st insemination while the remaining animal became pregnant following subsequent insemination. There was also improvement of other clinical signs in these animals. These observations are in agreement with the reports of Bhandari *et al.* (1975) and Samanta (1992) in anoestrus cattle treated with Tonophosphan. But the animals of Gr. B (untreated control group) did not show any signs of oestrus during next four months of observations.

Morrow (1969) detected hypophosphataemia as the main cause of infertility in an infertile herd of dairy heifers. He administered Dicalcium phosphate to the animals. Scharp (1979) also treated an infertile dairy herd of phosphorus dificiency with defluorinated superphosphate in drinking water and observed improvement in fertility in the animals.

Therefore it is postulated that administration of phosphorus (Tonophosphan) certainly induced the pituitary ovarian axis, stimulated the secretion of the gonadotrophic hormones by the pituitary, helped in the conversion of carotene to vit. A and thus helped for normal ovarian activity.

Failure in the rest of 5 animals, might be due to some other factors other than the deficiency of phosphorus, like deficiency of iron, copper, cobalt and protein etc.

From the above observations, it is concluded that, Tonophosphan is effective in treating the anoestrus heifers and cows with phosphorus deficiency.

SUMMARY

A clinical trial was conducted in Anoestrus heifers and cows with Tonophosphan given @ 10 ml. intramuscularly on alternate days for 3 occasions. On the basis of the observations, Tonophosphan was found to be effective in correcting the infertile conditions due to phosphorus deficiency in cattle.

References:

Ali, M.D.; Kanjilal, B.C.; Bandopadhyay, S.K.; Roy Choudhury, R. and Ghosh, B.B. (1991). Indian J. Anim. Report, *12*(1): 32-35.

Aminudeen; Pareek, P.K. and Ghosal, A.K. (1984) Indian J. Anim. Sci. *54*(8): 751-755.

Bhandari, R.M.; Kaikaini, A.S. and Kadu, M.S. (1975). Indian Vet. J.. *52*: 76.

Chetty, A.V. and Rao, A.R. (1986). Livestock Adviser. *XI* (6): 34-37.

Dutta, J.C.; Baruah, R.N.; Dutta, L. and Talukdar, S.C. (1988). Indian Vet. J. *65*(30: 239-241.

Fiske, C.H., and Subba Row, V. (1925) cited by Oser and Summerson (1965) "Hawk's Physiological Chemistry". 14 ed. Mc Graw-Hill Book Company Inc. New York.

Foley, R.C. (1952) Dairy Cattle Principles and Practices – Problems and Profits. Lea & Febiger, Philadelphia.

Kumar, S. and Sharma, M.C. (1991). Indian Vet. J. *68*(4): 361-364.

Morrow, D.A. (1969). J. Am. Vet. Med. Ass. *124:* 761-767.

Roberts, S.J. (1971) Veterinary obstetric and genital diseases. 4th ed. Scientific Book Agency, Calcutta.

Samad, A.; Ali, K.M. and Rahman, A. (1980). Indian Vet. J. *57*:(2): 135-138.

Samanta, A.K. (1992). M. V.Sc. thesis submitted to Bidhan Chandra Krishi Viswa Vidyalaya. Nadia, West Bengal.

Scharp. D.W. (1979). Aust. Vet. J. *55*:(5): 240-243.

Etiopathology Of Yolk Sac Infection (Omphalitis) In Chicks Aged 0-3 Weeks

Ambujakshi T.P., Sreenivas Gowda R.N., Vijayasarathi S.K. and Satyanarayana M.L.
Department of Pathology, Veterinary College,
University of Agricultural Sciences, Bangalore

Summary

The incidence of persistent yolk sac infection, omphalitis and allied conditions in chicks aged within three weeks was found to be 29 per cent based on autopsy records. The organisms isolated from the yolk belonged to the genera *Escherichia, Pseudomonas, Streptococcus, Salmonella, Staphylococcus, Citrobacter* and *Klebsiella* in the order of frequency. The pathology and possible mode of infection of the yolk sac have been discussed.

Introduction

The yolk in baby chicks is known to be absorbed within 5-7 days of hatching. Conditions like navel ill or omphalitis and septicaemia have been described to interfere in the proper absorption of yolk, causing generalised yolk infection and leading to heavy mortality, thus affecting the economy of the poultry farmers and Hatcheries (Bhatia *et al*, 1971). A number of micro-organisms eg. *Salmonella, Escherichia coli, Staphylococci* and *Streptococci* have been isolated from such cases (Pathak *et al* 1960, Bhatia *et al 1971 &* 1972, and Sarma *et al* 1985). Since the etiopathological aspect of the yolk sac infection and related conditions appeared to be variable, an attempt was made to study the etiopathology of these conditions.

Materials & Methods

Chicks upto three weeks of age, that were received from the poultry farms in and around Bangalore for routine autopsy examination formed the basis for present study. Detailed bacteriological examinations were carried out to ascertain the causative agents as per Buxton and Fraser (1977). For histopathological examination tissues were processed following standard methods and stained with routine Haematoxylin and Eosin stain.

Results & Discussion

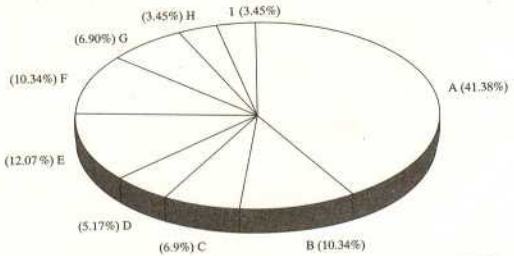
Out of 200 chicks examined, 58 (29%) chicks (0-3 weeks) showed lesions of persistent yolk sac, septicaemia and omphalitis. Yolk sacs were found to be distended containing foul smelling yolk material and colour of the yolk varied from yellow, red tinged, greenish yellow and creamy with the consistency varying from watery to thick pasty. These lesions were similar to those recorded by Bhatia *et al* (1971) and Sarma *et al* (1985).

Microscopically the yolk sac wall revealed congestion, haemorrhages, edema; vacuolation and proliferation of epithelial cells; necrosis with infiltration of inflammatory cells; degenerated and disintegrated yolk material with colonies of bacteria and calcium spheroids/yolk sac stones. These observations essentially confirmed the earlier reports (Pathak *et al* 1960, Bhatia *et al* 1971 & 1972, Jackson *et al* 1972, Coutts, 1981 and Shrivastava, 1990.)

Other organs like heart, liver, spleen, intestine, lungs, kidneys, intestine and bursa of Fabricius showed vascular degenerative, desquamative, inflammatory, necrotic and proliferative changes with colonies of organisms. The involvement of other visceral organs in persistent yolk sac infection could be attributable to toxaemic and/or septicaemic effects of individual or mixed bacterial infections (Pathak *et al* 1960 and Shimakura *et al* 1970). The presence of fungal granulomas in the lungs suggested a concomitant infection with *Aspergillus* fungus. The experience of bursal lesions in most of the cases seemed to indicate that subclinical infectious bursal disease (IBD) accounted for susceptibility to bacterial infection in the early chickhood.

Systematic bacterial examination of materials collected from 58 fresh carcasses of chicks resulted in the isolation of seven genus of bacteria (Graph 1).

Perusal of the Graph 1 indicates the predominance of Gram negative organisms (64.29%) over the Gram positive organisms (35.71%) which is in concurrence with the observations



GRAPH 1. BACTERIAL ISOLATIONS FROM YOLK SAC INFECTION.

A = Escherichia coli
B = Salmonella species
C = Citrobacter species
D = Klebsiella species
E = Pseudomonas species
F = Streptococcus species
G = Staphylococcus species
H = Salmonella sp. and Staphylococcus sp.
I = Citrobacter sp. and Streptococcus sp.

of Sarma *et al*. In this study, *E. coli* infection was accounted for an autopsy incidence of 41.38 per cent and thus seemed to be a major cause of yolk sac infection (Utomo *et al* 1990).

In the present investigation, *Salmonella spp.* of organisms were isolated only from 10.34 per cent of the cases, a figure lower compared to earlier decades shows that hygienic practices in hatcheries have become strengthened (Arora 1966 and Sarma *et al*, 1985).

Experiences of isolations of *Staphylococcus spp.* and *Streptococcus spp.* organisms in this study in the light of the earlier reports (Bhatia *et al*, 1971, Sarma *et al* 1985, Shrivastava 1990 and Utomo *et al* 1990) pointed out the need for keeping them in mind for their importance in yolk sac infection.

Isolations of *Citrobacter spp; Klebsiella spp.* and *Pseudomonas spp.* pointed out that they could contribute to lesions of yolk sac infection (Pathak *et al* 1960, Arora 1966, Feher 1979, Jackson *et al* 1972 and Shrivastava 1990).

Most of the organisms isolated in this study are considered as normal residents of the body and non-pathogenic, under certain conditions which lower down the vitality of the host, these organisms find the opportunity to invade the tissues and assume the pathogenic role. The ability of an organism to cause yolk sac infection depends on its ability to degrade and breakdown yolk proteins (Coutts, 1981). Harry (1957) described that bacteria with enzyme systems such as *Bacillus cereus* with lecithinase, *Proteus vulgaris* and *Pseudomonas aeruginosa* with protease enzymes, *Staphylococcus aureus* with lipase enzymes, disrupt and degrade the yolk lipoproteins, multiply extensively giving a pathway to other species of bacteria to proliferate rapidly and cause the death of chicks. Similar types of organisms were also encountered during the present study. Transovarian infection occurs usually due to eggs soiled or contaminated with faeces, unhygienic conditions of egg storage, high humidity in incubators and transfer of eggs from incubator to hatchery (Seneviratna, 1968). Though detailed investigation was not undertaken in these aspects, the type of organisms encountered in the present study enlightens the possibility of such infection at any stage.

The observations of the present investigation throws light on the possibility of severity of yolk sac infection and chick mortality in poultry industry due to bacterial flora, if proper sanitary and strict precautionary measures were not undertaken at every step, before, during and soon after hatching of eggs.

References :

Arora, A.K. (1966). Cited by Bhatia, K.C., Sharma, U.K. and Singh, N. (1971). Indian J. Anim. Hlth. **10**(1): 95-98.

Bhatia, K.C., Sharma, U.K. and Singh, N. (1971). Indian J. Anim. Hlth. **10**(1): 95-98

Bhatia, K.C., Sharma, V.K. and Singh, N. (1972). Indian J. Anim. Hlth. **11**(2): 173-176.

Buxton, A. and Fraser, G. (1977). Animal microbiology. Vol. I Blackwell Scientific Publication, Oxford.

Coutts, G.S. (1981). Poultry Diseases Under Modern Management. 2nd edn. Rajya Pub. Co., Ltd. England.

Feher, G. (1979). Anatomia Histologia Embryolgia **8**(4): 360-364.

Harry, E.G., (1957). Vet. Rec. **69**: 1433-1439. Cited by Pathak, R.C., Singh, C.M. and Tangri, R.P. (1960). Brit. Vet. J. **116**: 81-84.

Jackson, C.A.W., Kingston, D.J. and Hemsley, L.A. (1972). Aust. Vet. J., **48**: 481-487.

Pathak, R.C. Singh, C.M. and Tangri, R.P. (1960). Brit. Vet. J. **116**: 81-84.

Sarma, R.L.D., Lakshmana Char, N., Rama Krishna Rao, M., Inayathullah, D. and Narayana, G. (1985). Indian J. Poult Sci. **20**(4): 262-266.

Seneviratna, P. (1968). Diseases of Poultry (including caged birds), 2nd Edn., Bristol, John Wright and Sons Ltd.

Shimakura, S., Imamori, H. and Harai, K. (1970). Jap. Poult. Sci., **7**: 5761-67.

Shrivastava, P.K., (1990). Indian Vet. J. **67**(7-12): 1095-1098.

Utomo, B.N., Poernomo, S. and Iskander, (1990). Penyakit Hewan, **22**(40): 102-105.

Efficacy Of Butox Against Cattle Lice

Maske D.K. and Bhilegaonkar N.G.
Nagpur Veterinary College

Lice cause annoyance and restlessness in domestic animals, thereby resulting in reduced food intake, loss of energy and general health. For effective control of lice infestations number of chlorinated hydrocarbons and organophosphorous formulations are available. The disadvantages of these traditional insecticides are their high mammalian toxicity, undesirable smell and operational hazards to mankind. It was therefore desired to search for an alternative formulation which is relatively less toxic and safe for operation. With these considerations in mind in the present study, 'Butox' (pyrethroid Deltamethrin) a synthetic liquid compound, was tried for lice on domestic animals.

Materials and Methods

The work was carried out in a village, Amgaon in Hingna Block of Nagpur district (Maharashtra) under the National Service Scheme Programme during the period from November 1992 to February 93. The average temperature and relative humidity of the atmosphere ranged between 12°C to 31.4°C and 38 to 94 percent, respectively. In this village a large number of animals were suffering from heavy lice-infestation especially with *Linognathusvituli* species.

A total of 65 animals (cattle) of both sexes, ranging from six months to 9 years of age were selected for the present study. All infested animals were thoroughly sprayed with 12.5 ppm 'Butox' with the help of a hand spray. Care was taken to see that the drug is not sprayed on mouth, eyes and nostrils of the animals. Treated sites were examined clinically to find out the percentage reduction/killing of lice on the body. Subsequent observations were made at 15 days intervals for a period of three and half months to confirm the reinfestation.

Results and Discussion

Amongst infested parts of body of the animal, the wither, neck and brisket were densely infected with lice. Average lice count at such severely infested sites ranged between 12 to 25 lice per 25 square centimeter area, while the average lice count on back and abdominal region was in the range of 4 to 12 per unit area. Legs and tail region were free from lice infestation. Prior to the commencement of treatment, the infested animals were restless with quivering of skin and continuously lunging the irritable parts or rubbing the affected sites against the wall of sheds. On initiation of treatment the onset of effect of Butox was observed within 30 to 40 minutes after spraying. The affected lice started triggling in 30 minutes of treatment and moved from their resting places (root of hairs) and were seen crawling at tip of hairs. About 90 per cent of them were seen in comatosed stage with no signs of movement within 40 minutes. Cent-percent killing effect of 'Butox' was observed within one hour after the treatment. Thereafter, treated animals did not show any live lice on the body. It was interesting to note that after one hour of spraying, the animals appeared relieved of the restlessness and itching sensation. Similarly no other undesirable effect was seen in treated animals. Kulkarni *et al.* (1992) reported effective parasitological control of cattle tail lice *(Haematopinus quadripertusus)* with Butox@ 12.5 ppm sprayed at 15 days interval, the effect of drug lasting for one year. In our observations the animals were seen picking up infestation with lice from 91 days onwards from the day of commencement of single treatment. In the light of these observations, one spraying at 12.5 ppm dilution of 'Butox' is seen to provide satisfactory lice control at least for a period of 3 months with added advantages over chlorinated hydrocarbon and organophosphorous compounds viz. non toxicity to animals as well as to operator and good tolerance by animals. Repetition of the treatment at 3 months intervals is therefore recommended for an effective control of persistent lice

infection in a herd.

Summary

Sixty five cattle of all ages were sprayed with Butox (Pyrethroid Deltamethrin) @ 12.5 ppm for the lice (Linognathus Vituli) infestation. Complete disappearance of lice for about 90 days was noticed after single application. No toxic symptoms were observed in any of the animals of the operator.

References:

Kulkarni, P.D. ; Danayant, S.V.; Potdar, P.M. and Mujumdar, K.A. (1992). Indian vet. J. 69: 1129.

Role Of Maternal Antibody In Calves Against Rinderpest

Manickam R.
Professor and Head,
Department of Preventive Medicine,
Madras Veterinary College.

Of all the known viral diseases of livestock Rinderpest is the simplest disease to be eradicated easily as the vaccine available is highly immunogenic and potent to evoke a long lasting immunity. In addition to this the virus is highly fragile being sensitive to environmental influences and readily killed by heat, drying and most disinfectants. All these factors pave way for easy prevention and control of rinderpest. But resurgence of rinderpest with catastrophic results to dairy industry since recent years clearly proves the inefficient implementation of prophylactic measures.

Before studying the role of maternal antibodies in calves the behaviour of immune response to rinderpest antigen should be reviewed as it has got a bearing on maternal immunity. High neutralising antibodies have been reported following natural infection but not so even after repeated vaccination. High titre of immunoglobulins has evoked a poor immune response following vaccination but produced excellent response in animals with low or undetectable antibodies. Immunity under experimental conditions has persisted upto 4 years but not so under field conditions. Primary immunization has resulted in very poor immune response in calves. The immune status of dam is found to directly affect the induction of immune response as well as persistence of maternal antibodies in the offspring. Cell-mediated immunity is playing a tremendous role in the immunity to rinderpest.

Raising of immune status of herd and pregnant mothers plays a paramount role in reducing the incidence of rinderpest. The active immunity acquired either through undergoing the natural infection or by immunization executed the effector mechanism of immunity either by humoral or cellular immunity or both. On the other hand passive immunity mediated through immunoglobulins offers only humoral immunity for a transient period.

Role of maternal antibodies in young calves plays a vital role in the epizootology of rinderpest. Level of maternal antibodies in young calves depends on the degree of immune status of pregnant mothers and also on the quantity of colostrum fed to calves. Immunoglobulins (IgG types) being macromolecules can only be transferred to young calves through colostrum but not through placental circulation. Absorption of immunoglobulins present in the colostrum will be fast during the first four hours of birth and decline thereafter. Hence the level of passive immunity in calves depends upon the degree of immunity in pregnant mothers and the quantum of colostrum fed to calves in the first few hours of calving. This type of immunity normally persists for a period of 3-9 months. The passive immunity in calves is of only humoral type and the resistance offered to natural outbreak of rinderpest is only relative depending upon the concentration of immunoglobulin. The absence of the synergistic effect of humoral and cell-mediated immunity is often responsible for outbreaks of the disease in young calves.

Presence of maternal antibodies in young claves interferes with the onset of immune response to vaccination. Antigen given to calves is mopped by maternal antibodies and hence sufficient quantity of antigen is not available to produce adequate immune response. It is also not possible to assess the level of antibodies in calves under field conditions for adopting suitable vaccination programme. Under the above circumstances it is better to go in for mass vaccination of all calves irrespective of age and maternal antibody level under double vaccination programme at 6 months apart. Experimental evidence proves conclusively that this type of immunization in calves has produced a good degree of protective immunity.

In the rinderpest eradication programme (or) "Operation Zero-Rinderpest" it is advisable to have two types of vaccination schedules. In the first schedule TCRV vaccination may be done

every year instead of once in three years covering more than 90 percent of susceptible stock so as to enhance "herd immunity" as well as immunity in pregnant mothers. Under this schedule calves can be vaccinated after 6 months of age to avoid the interference of maternal antibodies in the production of immune response. In the second schedule vaccination can be done once in 3 years covering more than 90 percent of susceptible population. In this type calves may not get adequate maternal antibodies through colostrum and hence calves of any age can be included in the double vaccination programme at 6 months apart.

Maternal immunity if broken down by various kinds of stresses, malnutrition, intercurrent infection, immuno suppressive drugs, various types of toxins (Zoo-phyto-myco) etc., the transfer of antibodies through colostrum to calves will be meagre to offer passive immunity in calves. Similary presence of maternal antibodies in calves will also be waned fast if calves are subjected to the above immunity break-down factors. Hence calves should be nursed and managed to reap the good effects of maternal antibodies. Thus role of maternal antibodies in calves play a significant role in the prophylaxis of rinderpest.

Control Of Ticks – A Review

Jagannath M.S. and Rajeshwari Y.B.
University of Agricultural Sciences
Bangalore.

Ticks are important ectoparasites which pose a considerable threat to human beings and to animals all over the world. Ticks comprise a biologically and structurally conservative group of three families, about 150 species of Argasid and 650 species of Ixodid ticks are known to occur. They are obligatory blood sucking ectoparasites that attack all kinds of mammals, birds and reptiles. Economic losses in livestock production occur annually in the tropics and subtropics. In some countries ticks spread some of the deadly diseases like tick borne Encephalitis (TBE) and the recently discovered Lyme disease (Borreliosis) transmitted by *Ixodes ricinus* which shows their importance as vector for human pathogens (Burgdorfer *et al* 1982).

In a tropical country like India, the problem is more acute. It is difficult to estimate the actual losses but, they are large in terms of lowered milk and meat production, decreased weight, decreased work capacity, damage to hide, skin, wool and also mortality especially in the young animals. Ticks can also cause direct illness and their salivary gland secretions cause toxicosis. As early as 200 BC ticks were noticed as annoying pests of cattle and other domestic animals. However systematic study began only in the latter half of the 19th century. The incidence of KFD in human beings in Karnataka state gave a stimulus for intensive study on Haemaphysalis ticks by virus Research Institute, Pune. During the past 3-4 decades, there has been a tremendous upsurge in research on ticks, tick-borne diseases and their control in India.

Ticks are obligatory blood sucking and oviparous ectoparasites. In the manner of their development, they are classified as single host ticks, two host ticks and three host ticks. The transmitting potential of different species of ticks in various diseases has been well recognised necessitating their control. There are various methods of controlling ticks with varying degrees of success, (Wharton and Norris 1980, Sutherst 1983: Young *et al* 1986). But none of these would provide a complete protection from ticks and the diseases they transmit.

The aims of any tick control programme are to control tick-borne diseases, to increase productivity and to prevent the formation of lesions. It is extremely difficult to control these parasites and the disease which they transmit. Even today, the only prophylactic and therapeutic control measures against ticks is the massive use of acaricides. However in the last few decades it has been shown that long term use of acaricides to control ticks is highly problematical. There is great interest, therefore, all over the world in the development of alternative control measures. Immunological approaches in particular i.e. the development of Vaccines against these parasites are of a promising nature.

Chemical control:

Traditionally the control of ticks which is widely employed and most practicable is by use of acaricides. Early chemicals include sulphur, tobacco, nicotine sulphate and arsenicals. These were replaced in 1940s by chlorinated hydrocarbons such as DDT, BHC, Dieldrin, Chlordane and Lindane. They are extensively used but are hazardous as they get accumulated in the environment and body tissues for long periods. The milk and meat is found to be toxic. These chemicals are still being used in India though they are banned in other countries.

Organophosphorus (OP) compounds were then developed and these still play a major role in the protection of animal against most ectoparasites. OP compounds are extremely toxic (Cholinesterase inhibitors) in concentrated form but have the advantage that residue in animal tissues is minimal and short lived.

These with lower mammalian toxicity such as Malathion and Diazinon have found wide use in control of ticks. Some OP compounds like Neguvan. Rafoxanide and Famphur have the ability to act as systemic insecticides and are additionally good anthelmintics. Another group of insecticides, the carbamates e.g. Carbaryl and Baygon, become popular due to their relatively low mammalian toxicity and broad spectrum characteristics.

Synthetic pyrethroids replaced OP compounds in view of the reported development of resistance by ticks, followed by the discovery of avermectins-fermented products of *Streptomycetes avermitilis* which possess broad spectrum activity covering several ectoparasites like bots, mange mites and ticks, and many nematodes of domestic animals. The amidines and synthetic pyrethroids are more widely used and have a much longer residual effect than the other acaricidal groups but are considerably more expensive.

All the acaricides do not have any toxic or deleterious effect if used as per recommended concentrations. Chlorinated hydrocarbons should be repeated after 12 to 15 days. Organophosphorus compounds after a week and carbamates after 15 days. Besides dipping or spraying of animals, infested ground and sheds etc. should be sprayed with 5% of the acaricide. The other precautionary measures are spraying or dipping on a warm day,avoiding contamination of utensils, water tanks, feed troughs, feed, water, not allowing formation of pools of acaricides which animals may drink accidently leading to toxic effects, preventing animals from licking the skin soon after spraying. Animals should be watered before spraying or dipping. Closing of all cracks and crevices in animal shelters will reduce the tick breeding since ticks hide and breed in such places, as also construction of water moats (channels) around the animal houses to prevent the entry of ticks from outside.

The methods normally employed for applying acaricides to hosts are in principle to wet the animals with solutions or suspensions of chemicals by spraying or immersion in fluids (dipping). Other methods are fogging and dusting which have received universal approval. Dipping being considered the more effective means of application. In recent years several other methods of acaricide use have been tested including slow release of systemic acaricides from implants and boluses. The slow release of conventional acaricides from impregnated ear-tags, pour-ons which are applied on the backs of livestock and spread rapidly over the entire body surface, and spot-ons, which are similar to pour-ons but have less capacity to spread. Neither systemic acaricides nor acaricide impregnated ear-tags are being marketed in India. The pour-on and spot-on formulations, which contain synthetic pyrethroids are now available in some countries and their use is increasing. The advantage of these formulations are ease of application and long residual effect. Subcutaneous implants and intraruminal bolus form were found to be very useful in controlling myiasis producing flies.

Biological control :

The control of ticks by this method is very much limited. However some attempts made with *Ixodiphagus texanus, I. curtcelice* and *Huntrellus hookeri* are found to parasitise ticks but do not seem to exert any significant reduction in tick population (Davis & Campbel 1979). In recent years, a search and use of Microbes (Herbov *et al* 1977) Fungus, (Rodin 1977) Microsporida, (Weiser 1977), certain birds, (Soulsby 1982), Insects (Burns & Melancon 1977) and Pheromones (Gladney *et al* 1974) used in the control of ticks though successful are not widely exploited.

The application of acaricides on pastures and herbage have been of limited success (Metation-5-3 kg/hectare, Tetrachloravinophos -1 kg/hectare; Malathion-200 mg/hectare and Fenitrothion-1kg/hectare_. Rotation of pasture helps to reduce the tick infestation. Pasture management, cultivation and land usage which include temporary removal of host may help in reducing the tick population. It is possible that a planned dipping and pasture spelling will improve the efficiency of tick control.

Some grasses could be used as the basis for developing practical tropical tick control. (Thompson *et al* 1978: Burrows and Evan 1989). Besides the usage of miscellaneous plants Polyakov *et al* (1977) tested some native plants of the USSR for their acaricidal ef-

fect on adults of different ticks. The repellent activity of preparations from the fruits of *Amorpha fruticosa, Nicotiana rustica, Acca, sellouriann* and species of *Clematis* and *Juniperus*, was reported. These repellent plants could be cultivated around livestock farm, sown pastures and watering and resting places to achieve tick control. It might also prove economical to use them in livestock feed which would bring about control.

This department has conducted extensive work on acaricidal effect of a leguminous plant *stylosanthus scabra. S. scabra* produces a sticky secretion which immediately immobilises the larvae of ticks. The secretion has the potential to slowly reduce the population of all species of ticks. *In vitro* studies showed that the aqueous and methanol extracts of leaves of *S. scabra* found to possess good acaricidal effect. Highest mortality of ticks was observed when exposed to 7-10 months old plants (Khudrathulla *et al* 1992) This leguminous plant could be grown around livestock farms, which meets the fodder requirement and also ensures effective tick control resulting in improved health and production. Improved host nutrition results from pasture management and helps the host to maintain its resistance against ticks. In the tropics there is wide scope for improvement of nutrition. Pasture spraying which had some success in Australia in reducing the population of the one host tick Boophilus is inapplicable in India where pasture land is limited and the multi host tick *H. anatolicum* is the main species.

Other methods and new approaches:

A new class of insect control agents – Insect growth regulators (IGR's) have stimulated much interest in recent years. They are highly effective at very low doses and undergo rapid degradation in the environment. Methoprene and Diflubenzuron are two of the IGR's that have received considerable attention in Veterinary Entomology.

Host resistance: This provides a valuable basis for parasitic control and has been greatly recognised. The exploitation of the natural resistance of the host animal has been widely reported from Australia for the control of *B. microplus* resistant cattle such as Zebu *(Bos indicus)* breeds and their crosses are more resistant than the European breeds. Selection and breeding for tick resistance holds promise for controlling the tick species including *Hyalomma.* Host resistance reduces the risks of major losses by limiting the potential of tick populations. Genetics has been used in understanding the evaluation of resistance to pesticides in recent years which may be helpful in devising solutions to the problem.

Recombinant DNA technology is expected to influence pest control by development and improvement of pathogenic bacteria and secondly by using bacteria to produce pesticidal compounds. The demonstration of successful ectoparasitic control with *Bacillus thurungiensis* protein toxin and more importantly, the discovery that the toxin is a single glycoprotein amenable to genetic manipulation augurs well for possibility of engineering such toxins. Another interesting area of genetic research has been the use of biologically or chemically induced sterility. The hybrid male progeny of mating *B. microplus* and *B. annulatus* are sterile. The release of sterile males can be integrated with a control programme using systemic pesticide insect growth regulator.

Immunisation:

Recent advances in immunology with the help of biotechnology helps in the production of effective vaccine. The immunizing agent is a concealed tick antigen, not encountered by the host.

Once the components concerned with resistance are known, the vaccine could be produced on a large scale by genetic engineering which would be necessary for extensive commercial use, with modern vaccine design. It would also be conceivable to increase immunity by altering active components and by adding suitable adjuvants.

Monoclonal antibodies are being used to identify, isolate and purify antigens while genetic engineering is being used to produce large quantities of pure antigen. The antigen is derived from crude extract of partially engorged adult ticks. It stimulates the production of an antibody that damages tick gut cells and kills the ticks or drastically reduce their reproductive potential. This method renders other con-

trol methods obsolete and completely alters the approach.

Many attempts have been made to immunise laboratory animals and cattle with crude or partically defined salivary glands extracts or cement. It was also possible to induce protection against ticks with extracts of other tick organs. Allen and Humphreys (1979) succeeded in achieving a high degree of resistance in Guineapigs by immunising them with extract of either midgut and reproductive system (Antigen 1) or all the organs (Antigen 2) of *Dermacenter andersoni* females. Immunisation against midgut antigens seems to be highly promising.

With the development of new chemicals, work on delivery systems for more efficient and safe use of the chemicals and maximising their effective life, will continue to be important for future progress. In the present day context the term Integrated Pest Management means, the integration of control methods consistent with ecological, economic and sociological requirements. It is a judicious combination of available control methods to make the best use of each without too much reliance on any single approach.

Finally, good nutrition and cleanliness is important to prevent tick infestation. We can say that a healthy and well nourished animal is less prone for tick infestation. Exercise and regular grooming helps in keeping the skin and hair coat healthy and tick free. General hygienic measures also contribute by eliminating or reducing the breeding places of ticks in the animal environment.

References:

Allen, J.R. (1973) – S. J. Humphreys (1979): Nature *280:* 491-493.

Burgdorfer, W. A.D. Barbour – S.F. Hayes – J. L. Benach – E. Groundwaldt, J.D. Davis (1982). Science *216:* 1317-1319.

Burns. E.C. and Melancon, D.G., 1977, J.Med. Entomol., *14:* 247-249.

Burrose, A.T.M. DE and Evans D.E. 1989. Pesquisa Veterinaria Brasileira *9:* 17-21 (Rev. App. Entomol. *79:* 1937).

Davis, A.J. and Campbell, A., 1979, Canadian J. Zool., *57:* 1164-1166 (Rev. App. Entomol. *67:* 2744).

Gladney, W.J., Grabbe, R.R., Ernst, S.E. and Oehler, D.D. 1974. J. Med. Entomol. *11:* 303-306.

Herbov, D.D. Radoucheva, T.S., Popov, C.S. and Veljanov, D.K., 1977, bulgare des Sciences, 30: 289-291. (Rev. App. Entomol., *66,* 1058).

Khudrathulla, M. S. Jagannath and S. Abdul Rehman 1992. Paper presented at Third National Symposium on Vectors and vector borne diseases, held at Bombay. 29-30 Sept. 1992.

Polyakov. D.K. Khaidarov, K.M. and Shreter. A.I. 1977, Resursy, *13:* 267-275. (Rev. App. Entomol. *68,* 246).

Radin, S.D. 1877, Arakhnozy protozoinye bolezni Sel' skhozyaistvennykh Zhivotnyk. Moscow. USSR. p 44-49. (Rev. App. Ent. *67:* 1948).

Soulsby, E.J.L., 1982 *Helminths, Arthropods and Protozoa of Domesticated Animals. 7th Edn. Bailliere Tindall. London* U.K., p. 475.

Sutherst, R.W. 1983, livestock. In: *Tropical parasitosis and Parasitic Zoonosis.* Ed. Dunsmoore, J.P. Murdoch University. Perth p. 41-56.

Thompson, K.C., Roa E.J. and Romero N.T., 1978, Trop. Anim. Hlth prod., *10:* 179-188.

Weiser, J. 1977, Fifth Int. Cong. Protozool. New York City. 26 June-2 July, 1977. Ed. Hunter, S.H.P. 326-340 (Rev. App. Entomol. *66:* 2559).

Wharton. R.H. and Norris, K.R., 1980, Vet. Parasit., *6:* 135-164.

Young, A.S., Groocock, C.M. and Kariuki, D.P., 1986, Parasit, *96:* 403-432.

An Appeal

All the members of the Veterinary Profession are invited to contribute their papers for publication in the Blue Cross Book and share their experience with their brethren. The Papers should not have been published elsewhere and should generally not exceed six to eight pages.

– Editor

The Role Of Flavomycin On Extra Chromosomal Resistance In *Salmonella gallinarum* In Broiler Chicken

Rafeeq Ahmed S., Vikram Reddy, M. Sheshagiri Rao A. and Dhanlakshmi K.

Introduction:

Antibiotics have been proved highly beneficial in controlling various bacterial diseases. It is customary to add some kind of antibiotics and/or nitrofurans to broiler ration, to keep these bacterial diseases under control and also to promote better growth and feed conversion. However, their indiscriminate use in feed for prolonged periods results in inducing the development of resistant strains of bacteria, mostly pathogenic species. As such the drugs lose their efficacy against the most common bacterial diseases in the event of outbreaks. Another serious problem posed by these resistant strains is the transfer of their resistance to related species as well as unrelated genera through plasmids.

Plasmids are pieces of DNA present in the bacterial cell outside the chromosomal DNA. These plasmids can carry genes encoding numerous traits including those conferring antibiotics resistance. This means that a resistant organism can transmit the resistance to a population of antibiotics sensitive microbes.

Recently Hoechst Pharmaceuticals has introduced Flavomycin 40 as a new generation growth promoter that can be used in broilers and layers. As per literature, Flavomycin 40 is free from resistance and cross resistance problems. It also eliminates extra chromosomal resistance developments. In this experiment an attempt was, therefore made to know the role of Flavomycin in eliminating the development of extra chromosomal resistance to a field isolate of *Salmonella gallinarum* whose antibiogram is pre-determined.

Materials and Methods:

Straight run 180 day old commercial chicks were randomized on uniform body weight basis into six groups of 30 birds each. All the birds were offered similar broiler rations, during starter (day old to 28 days) and finisher phases (29 to 56 days of age). The first five groups were fed with rations containing different drugs (Table No. 1), while the sixth group was maintained on the normal commercial rations (with no added drug).

Feed and water were offered *ad lib* and the chickens were vaccinated with Ranikhet disease F_1 vaccine on 7th day. Individual body weights were recorded group wise, at the end of each week.

After determining the antibiogram pattern of *Salmonella gallinarum*, the birds were challenged with 18 hours old culture of *Salmonella gallinarum* with a dose of 1×10^{10} cell/ml by oral route at the onset of fifth week (29th day of age). Subsequently, at the end of 6th, 7th and 8th weeks, ten birds from each group were sacrificed and different organs viz., liver, bile duct, spleen, intestine caecum, crop and proventriculus were collected. All the samples were processed for isolation of *Salmonella gallinarum* employing the procedure of Bergy's manual of determinative Bacteriology.

The antibiogram pattern of *Salmonella gallinarum* isolates at different intervals, were determined using antibiotics namely Ampicillin (A), Chloramphenicol (C) Chlortetracycline (CT) Loxycycline (D) Oxytetracycline (O) Streptomycin (S), Nitrofuran (NF) and Triple sulfas (S_3) by standard disc diffusion method.

Tissue pieces from liver, intestine, caeca and cloaca were collected in 10% formalin for histopatnological studies.

The data on body weight gains was analysed statistically by the method of Analysis of Varlance. (Bhedecor and Coenran, 1968).

Results and Discussion:

By observing the histological changes in all the treatment groups and control at different slaughter periods it was apparent that Flavomycin treated group showed comparatively lesser degree of changes at 2nd & 3rd slaughters when compared to other treatment

and control groups. Further some of the sections gave an indication of mounting immunological response to the above organism.

The antibiogram pattern of *Salmonella gallinarum* isolated from different groups at different intervals has been presented in the tables 2, 3 & 4.

The antibiogram pattern of *Salmonella gallinarum* re-isolated from group I (ie., birds maintained with Flavomycin-40) after 2, 3 and 4 weeks post-infection (PI) showed more or less the same sensitivity pattern ie., without acquiring resistance to any of the antibiotics tested.

The antibiotic sensitivity pattern of *Slamonella gallinarum* re-isolated Group II infected birds showed resistance to streptomycin at two weeks post infection (PI) and Doxycycline after 3 weeks of post infection and resistance to Streptomycin continued even after 4 weeks of post infection. With regard to Group III the organisms acquired resistanee to Streptomycin but became sensitive to triple sulfas at two weeks of post infection. At 3 weeks post infection the organisms acquired resistance to Doxycycline also, besides Streptomycin and at 4 weeks post infection the organisms acquired resistance to Nitrofuran and Triple Sulfas. The resistance to Streptomycin and Doxycycline which was observed at 3rd week was not evident.

The organisms re-isolated from Group IV acquired resistance to Nitrofuran, Doxycycline and Ampicillin but were resistant to Triple Sulfas at 2 weeks post infection. At 3rd week of post infection the organisms also acquired resistance to Streptomycin in addition to Nitrofuran, Doxycycline and Ampicillin but developed sensitivity to Triple Sulfas. While at 4th week the resistance to Doxycycline disappeared whereas resistance to Ampicillin, Streptomycin and Triple Sulfas was observed.

The organisms from Group V acquired additional resistance to Chlortetracycline at 2 weeks and to Streptomycin at 3 weeks of post infection. At 4th week of post infection they acquired resistance to Oxytetracycline and developed sensitivity to Streptomycin but resistance to Chlortetracycline and Triple Sulfas continued.

The sensitivity pattern of *Salmonella gallinarum* isolated from Group VI revealed that the organisms acquired additional resistance to Chlortetracycline, Streptomycin, Doxycycline, Oxytetracycline and Ampicillin at 2 weeks of post infection and the resistance to Triple sulfas disappeared. At 3 weeks of post infection resistance to Chlortetracycline, Doxycycline, Oxytetracycline continued and resistance to Triple sulfas again. The sensitivity pattern of this group after 4 weeks post infection revealed resistance to Ampicillin, Triple sulfas, Chlortetracycline, Doxycycline and Ampicillin.

The above results suggest that *Salmonella gallinarum* isolated from groups of birds which were on the diet with different feed additives like Terramycin, Zinc Bacitracin, Furozolidone, Virginamycin acquired resistance to different antibiotics during their replication in these birds indicating the transfer of R plasmids freely from the intestinal flora to *Salmonella gallinarum* and vice versa. These results further indicate that the supplementation of the above feed additives in the broiler diets might not have prevented the transfer of 'R' plasmids. This can be attributed to the non-inhibition of sex pilus formation which is required for transfer of R-Plasmids. Therefore, it can be concluded that on the contrary, incorportion of Flavomycin-40 in the broiler diets may have an additional advantage in preventing the emergence of antibiotic resistant strains of bacteria.

Table 1. Ration containing different drugs.

S. No.	Group	Feed additive added	*Concentration per quintal
1.	I	Flavomycin 40	10G
2.	II	Stafac-20 (Virginamycin)	50G
3.	III	TM 50 (Terramycin)	100G upto 3 weeks 50G from 4 to 8 weeks
4.	IV	Afa (Zinc bacitracin)	50G
5.	V	Neftin (Furazolidone)	50G
6.	VI	Control	–

* Feed additives were added as per the literature of the respective companies.

Table 2. Antibiogram pattern S.*gallinarum* isolated at 2 weeks of post – Infection.

		Antibiotics/Chemotherapeutics							
S. No.	Culture	Nf	S_3	Ct	S	D_0	O	C	A
1.	S.gallinarum before inoculation. Re-isolated from	14*	R*	10	12	20	12	24	21
2.	Group I	20	R	20	10	20	24	26	20
3.	Group II	15	R	20	R	15	20	20	20
4.	Group III	20	18	20	R	9	24	24	20
5.	Group IV	R	20	21	10	R	21	24	R
6.	Group V	8	R	R	12	11	20	22	20
7.	Group VI	13	10	R	R	R	R	23	R

* Inhibition Zone measured in mm.

R Resistant (No Zone of inhibition)

Table 3. Antibiogram pattern S.*gallinarum* isolated at 3 weeks of post-infection.

Group	Nf	S_3	Ct	S	Do	O	C	A
I	13*	R	10	12	20	13	26	20
II	14	R	14	R	R	15	22	10
III	18	14	19	R	R	19	24	20
IV	R	18	20	R	R	20	25	R
V	8	R	R	R	11	10	22	18
VI	10	R	R	10	R	R	18	14

R Resistant (No zone of inhibition)
* Zone of inhibition in mm.

Table 4. Antibiogram pattern *S.gallinarum* isolated at 4 weeks of post infection.

Group	Nf	S_3	Ct	S	D_0	O	C	A
I	10*	R	11	11	19	14	20	24
II	14	R	18	R	12	16	18	15
III	R	R	12	12	20	10	12	12
IV	10	R	19	R	12	19	24	R
V	9	R	R	12	10	R	20	18
VI	9	R	R	9	R	10	24	R

* Zone of inhibition in mm.
R Resistant.

Comparative Efficacy Of Oxyclozanide, Nitroxynil, Triclabendazole And Rafoxanide In Outbreaks Of Fascioliasis In Sheep In Punjab.

Jasmer Singh, Gill J.S, Gill B.S. and Kwatra M.S.
Department of Vety. Public Health and Epidemiology,
Punjab Agricultural University Ludhiana.

Fascioliasis in domesticated ruminants caused by *Fasciola gigantica* in Punjab and elsewhere is of great economic importance. In sheep and goats the disease occurs in acute outbreaks. However, in cattle and buffaloes it is mostly of chronic form but nevertheless outbreaks do occur (Ross *et al.*, 1968.)

Several fasciolicides have been reported to possess high efficacy against mature and immature forms of the parasite in goats (Wolf, *et al.*, 1983) in sheep (Turner *et al.*, 1984; Owen, 1987; Misra *et al* 1987; Gupta *et al.*, 1989) in buffaloes (Misra *et al.*, 1987; Gupta *et al.*, 1989) and in cattle (Rapic *et. al.*, 1988; Richards *et al.*, 1990) In this communication comparative efficacy of four fasciolicides in seven outbreaks of fascioliasis in sheep in Punjab is reported.

All the places of occurrence of outbreaks of fascioliasis were visited and animals examined, post-mortem of dead or dying animals was conducted and diagnosis confirmed that cause of death was fascioliasis. Faecal samples from sick animals were collected and eggs per gram of faeces (EPG) was evaluated by McMaster Method. Blood samples from sheep were collected before and after treatment for hematology and biochemical analysis.

At each site within the flock 5 sick animals were separated and kept as untreated controls. The remaining sick animals were treated with one anthelmintic at each flock site. Supportive therapy with Livogen 5 ml/ 1/m (3 injections) on alternative day was given at one flock site. i.e., village Hole, district Ludhiana.

All the flocks were revisited after three weeks and faecal samples from the treated and untreated sheep were collected and screened for Fasciola eggs.

Description of various anthelmintics used is given below:

S. No.	Chemical	Trade Mark	No. of animals treated	Dose	Route of administration
1.	Nitroxynil	Trodax (M & B)	350	1.5 ml per 50 Kg	S/C
2.	Oxyclozanide	Tolzan-F (Hoechst)	300	20 mg/Kg	Orally
3.	Triclabendazole	Fasinex (Ciba-Geigy)	10	10 mg/Kg	-do-
4.	Rafoxanide	Ranide (MSD)	35	7.5 mg/Kg	-do-

Results And Discussion

It was observed that treatment with nitroxynil, oxyclozanide and triclabendazole resulted in 99, 98 & 99 percent clearance of oviposition by Fasciola worms. It showed that these drugs killed all the adult worms. However treatment by rafoxanide resulted in 70 percent reduction of oviposition which indicates that this drug was not completely effective in eliminating the adult worms. Further it was also observed that the former three drugs also affected the immature worms because three weeks after treatment, the faecal examination was almost negative.

Analysis of blood revealed that haemoglobin increased from 8.6 to 10.8 percent and total protein content from 6.8 to 8.0 percent during the three week post treatment period of obser-

vation. It was also found that these drugs were safe and did not evoke any untoward reaction. All these flock owners were advised to administer these drugs prophylactically in the month of May and October. Following that the sheep given these medications did not suffer from fascioliasis except in one flock, at Rahno, Ludhiana. It is evident that if the animals usually sent for grazing in the endemic areas are dosed with fasciolicides they can be protected from the malady. However, the control of snails in such areas cannot be over emphasized and if prophylactic medication of fasciolicides and snail control is practiced the disease could be contained.

References

Gupta, S.C, Chandra R and Yadav S.C. (1989). Ind Vet. J. 66, 680-682.

Misra, S.C, Swain, G. Panda, M.R. Panda, D.N. and Das Mohapatra, M.P. (1987). Ind. Vet. J. 64, 701-704.

Owen, I.L. 1987. Aust. Vet. J. 64, 59-61.

Rapic, D., Dzkula N., Sakar D. and Richards, R.J. (1988), Vet. Rec. 122, 59-62.

Richards, R.J. Bowen, F.L., Ess enweir, F., Steizer, R.F. and Buscher, G. (1990). Vet. Rec. 126, 213-216

Ross, J.G. Geary, T.C. and Welsh, J.C. (1968) Vet. J. 22, 82

Turner, K. Armour, J. and Richards, R.J. (1984) Vet. Rec. 114, 41-42.

Wolf K, Eckert J., Schaeiter G. and Lutz H. (1983) Irish Vet. Parasitol 13, 145.

Important Adverse Drug Interactions In Veterinary Practice

Gatne M.M., Ranade V.V. & Jagdish S.
Bombay Veterinary College, Parel, Bombay

Rapid advances in research in basic Pharmacology and Pharmaceutical industry have resulted in the availability of a large number of drugs to veterinarians and this has stimulated their concomitant use with the hope that the maximum therapeutic effect will be achieved (Eckhoff, 1980). Multiple drug therapy used in veterinary practice may occasionally produce adverse responses.

Drug interactions occur whenever the prophylactic, therapeutic or diagnostic action of a drug is altered in or on the body by a second chemical administered previously, concurrently or in close sequence. The second substance (interactant) may be another drug, an excipient, a food or a dietary or environmental chemical or contaminant.

Prediction of a patient's response to multiple drug therapy is difficult because drugs may act at more than one site and by more than one mechanism. They do not necessarily occur in all patients given the same drug combination (Bevan & Thompson, 1983). The list of drug interactions cited in literature is too long to memorise, but it is important to have basic understanding of mechanisms by which interactions develop.

Many a time recommendations made in human literature are accepted for applying to veterinary therapy. However, there are some interactions of importance in veterinary work which do not figure prominently in human medicine (Reilly and Isaacs, 1983). Important consideration should therefore be given to drug interaction by a Veterinary Physician for prevention of drug residues in meat and milk since withdrawal times may change as a result of drug interaction (Eckhoff, 1980).

When drug interaction occurs, the action of either or both interactants may be increased, decreased, altered or may show no change. Only those interactions producing adverse effects are discussed here.

In-Vitro Drug Interactions (Incompatibility)

Incompatibility should be a major concern when practitioner mixes different drugs in the same syringe or infusion bottles (Davis, 1988).

The combination of two or more drugs in solution resulting in loss of or modification of activity may affect *in-vivo* availability adversely.

The incompatibilities involving chemical reactions such as hydrolysis, oxidation, reduction or complex formation are manifested by number of ways such as precipitation, change in colour, evolution of gas, gelatinization or inactivation without any visible interaction.

Table 1 and Table 2 exemplify the drug incompatibilities between solutions used for intravenous fluid therapy and parenteral solutions respectively.

TABLE 1: Guide to compatibility of drugs with intravenous fluids (Reilly and Isaacs, 1983)

Drug	Incompatible intravenous fluids	Compatible intravenous fluids
Ampicillin sodium	Dextrose solutions Dextran	Normal saline* Compound sodium lactate†
Adrenaline	Sodium bicarbonate and other solutions with pH>5.5	Normal saline
Benzylpenicillin sodium	Dextrose solutions‡	Normal saline*
Cloxacillin sodium	Dextrose solutions>5%	Normal saline* Ringer's solution Dextrose saline*
Diazepam	Addition to intravenous fluids not recommended, insoluble in most solutions	
Gentamicin sulphate	Any solutions where the concentration of gentamicin exceeds 1 g litre	Normal saline Dextrose Dextrose saline } §
Heparin sodium	Dextrose solutions‡	Compatible with most solutions
Magnesium sulphate	Sodium bicarbonate	Normal saline Dextrose Dextrose saline
Methyl-prednisolone Sodium succinate	Compound sodium lactate'	Normal saline Dextrose Dextrose saline
Noradrenaline Bitartrate	Normal saline Sodium bicarbonate	Dextrose Dextrose saline
Oxytetracycline hydrochloride	Solutions contains Ca^2 or Mg^2 (eg. Ringer's solutions)‡ Dextrose‡	Normal saline**
Oxytoxcin	Dextran 12% Normosol M dextrose 5%††	Dextrose 5% Normal saline
Sodium bicarbonate	Compound sodium lactate Ringer's solution Ca^2 containing solutions	Normal saline Dextrose Dextrose saline
Sulphadiazine sodium	Dextrose 10% Electrolyte solutions	Normal saline Dextrose saline Dextrose 5%
Sulphisoxazole diolamine	Electrolyte solutions	Normal saline Dextrose Dextrose saline
Vitamin B complex with vitamin C	Sodium bicarbonate	Normal saline Dextrose Dextrose saline Compound sodium lactate

**Retains approximately 90 per cent of its potency over 24 hours*
†Retains approximately 90 per cent of its potency over four hours
‡Conflicting literature
§Use within one-and-a-half to two hours
'If the concentration of methylprednisolone sodium succinate exceeds 500 mg litre
¶If the concentration of methylprednisolone sodium succinate is less than 500 mg litre
***Use within six hours*
††Due to the presence of the preservative sodium bisulphite in this solution.
Additional information can be found in Trissel (1980), Martindale (1977) and Engel (1971)

TABLE 2: Incompatibilities of parenteral drugs (Reilly and Isaacs, 1983)

Drug	Incompatible with
Acetylpromazine maleate	Phenylbutazone sodium
Ampicillins sodium (and other semisynthetic penicillins)	Many incompatibilities, do not mix with other drugs
Atropine sulphate	Barbiturates, diazepam
Barbiturates	Many incompatibilities, do not mix with other drugs
Benzylpenicillin sodium	Many incompatibilities, do not mix with other drugs
Calcium gluconate	Carbonates, phosphates, sulphates, (eg. sodium bicarbonate, potassium phosphate, streptomycin sulphate), promethazine hydrochloride, tetracyclines.
Chloramphenicol sodium succinate	Erythromycin, hydrocortisone sodium succinate, heparin sodium, gentamicin, penicillins, tetracylines, chlorpromazine hydrochloride, vitamins B and C
Chlorpromazine hydrochloride	Chloramphenicol sodium succinate, atropine sulphate, hydrocortisone sodium succinate, tetracyclines, sulphonamides, viatmins B and C, phenylbutazone sodium.
Diazepam	Many incompatibilities, do not mix with other drugs
Droperidol	Barbiturates
Fentanyl	Barbiturates
Gentamicin sulphate	Carbenicillin (and other penicillins), heparin sodium, sulphonamides, chloramphenicol sodium succinate, cephalosporins
Heparin sodium	Aminoglycosides, benzylpenicillin sodium hydrocortisone sodium succinate, tetracyclines, pethidine hydrochloride, atropine sulphate, promethazine hydrochloride, tylosin
Hydrocortisone sodium succinate	Chloramphenicol sodium succinate, heparin sodium, aminoglycosides, noradrenaline, tetracyclines, barbiturates, promethazine hydrochloride, chlorpromazine hydrochloride, tylosin.
Ketamine hydrochloride	Barbiturates
Lincomycin	Penicillins
Methylprednisolone sodium succinate	Calcium gluconate, penicillin G. tetracyclines. pethidine hydrochloride, thiopentone sodium,

	sulphonamides, vitamins B and C
Noradrenaline bitartrate	Sodium bicarbonate, barbiturates, aminoglycosides, sulphonamides
Pethidine hydrochloride	Barbiturates, heparin sodium, methylprednisolone sodium succinate, sodium bicarbonate
Phenylbutazone sodium	Acetylpromazine hydrochloride, chlorpromazine hydrochloride
Potassium chloride	Adrenaline, sulphadiazine sodium
Prednisolone sodium phosphate	Calcium gluconate, promethazine hydrochloride
Promethazine hydrochloride	Many incompatibilities, do not mix with other drugs
Streptomycin sulphate	Calcium gluconate, sodium bicarbonate, heparin sodium, sulphonamides, tylosin
Sulphonamides	Many incompatibilities, do not mix with other drugs
Suxamethoinium chloride	Do not mix with thiopentone or other alkaline solutions
Tetracyclines	Preparations with a high concentration of sodium or calcium salts, penicillins, cephalosporins, heparin sodium, barbiturates, chloramphenicol sodium succinate, hydrocortisone sodium succinate, sodium bicarbonate, tylosin.
Tylosin	Heparin sodium, hydrocortisone sodium succinate, streptomycin, tetracyclines
Vitamin B complex	Many incompatibilities do not mix with other drugs

In-Vivo Drug Interactions

These interactions involve effect on absorption, distribution, metabolism or excretion of one agent by another or effect at receptor site.

Interactions Affecting Absorption

Most interactions altering absorption occur in the gastrointestinal tract. pH changes, physical or chemical binding of drugs, alteration in motility and contents of gastrointestinal tract affect absorption adversely. The drug interactions of veterinary relevance affecting absorption are as below:

Drug	Interactant	Mechanism of interaction
1. Tetracyclines	Aluminium, Calcium and Magnesium Ions.	Interactants decrease availability by forming chelates.
2. Lincomycin	Kaolin	Erratic absorption of drug.
3. Penicillins	Aluminium Hydroxide	Erractic absorption of drug.
4. Erythromycin	Agents delaying gastric emptying	Drug is retained for more time therefore is subjected to the liable action of acid in the stomach.

Interactions Affecting Distribution

Drug	Interactant	Mechanism of interaction
1. Warfarin	Phenyl butaxone	Plasma drug level is increased due to the displacement of drug from the receptor site on albumin by the interactant.

Interactions Affecting Metabolism

Drug	Interactant/s	Mechanism of interaction
1. Corticosteroids	Phenylbutazone, Phenytoin	Decreased availability of drug due to induction of microsomal enzymes and resultant stimulation of metabolism of drug.
2. Chloramphenicol, Griseofulvin Phenytoin Certisol.	Phenobarbitone	-as above-
3. Pentobarbitone	Chloramphenicol	Sleeping time with drug increased due to inhibition of microsomal enzymes by interactant.

Interactions At Receptor Site

Drug	Interactant	Mechanism of interaction
1. Organophosphorus insecticides	Phenothiazine, Suxamethonium	Potentiation of drug due to inhibition of choline – esterases.
2. D-tubocurarine	Aminoglycosides	Neuro muscular blockade potentiated.

Drug interactions can be prevented by avoiding multiple drug therapy but this seems to be an impracticable way. However, the incidence of adverse drug interactions can be minimized if the basic principles of the mechanisms of interaction are known (Reilly and Isaacs, 1983). Prevention and management of adverse drug interactions in veterinary medical practice clearly dictate the need of education in clinical pharmacology.

There is a need for organised efforts to report or record drug interactions or adverse drug reactions in Veterinary Practice. The work seems very complex and laborious due to species differences in response. The veterinary education institutes, Veterinary Polyclinics/Hospitals can play an important role in this regard due to regular record keeping. The field veterinarians should be provided with update of reported drug interactions periodically. There should be good interaction between drug industry and veterinarians for this purpose.

References

1. Bevan J.A. and Thompson J.H. (1983) in Essentials of Pharmacology, 3rd edition, Harper and Row Publishers, Philadelphia, pp 77-78
2. Davis L.E. (1988) in Veterinary Pharmacology and Therapeutics, 6th edition, Ed. N.H. Booth and L.E. McDonald, Panima Publishing Corporation, New Delhi pp 22-23
3. Eckhoff A (1980) J.Am. Vet. Med. Assoc. 176 (10): 1131-1133
4. Reilly P E B and Isaacs J.P. (1983) Vet. Rec. **112**: 29-33.

Study Of Effect Of Performance Promoter Flavomycin 40 – (Flavo Phospholipol) On Growth Promotion FCR And Mortality

Mulbagal A.N., Narsapur V.S. & Mujumdar K.A.
Bombay Veterinary College, Bombay & **Animal Health Divn., Hoechst India Ltd., Bombay 93

World population growth of 250,000 people each day and a continuing increase in consumption of poultry meat combine to make prevention, treatment and cost effective performance more important than ever. As feeding and genetic techniques continue to improve to meet an increasing demand for poultry meat, the use of performance promoters further offers the possibility of yielding more quantity of poultry produce with less feed and thus more economically and more competitively. The purpose of this report is to present the findings of multi location studies conducted by us in commercial broiler farms with a performance promoter – Flavomycin 40 (Hoechst India Ltd) in feed.

Three studies were conducted that included more than 15,000 broilers. Flavomycin 40 was added @ 100 g/ton of feed (4 ppm) in two studies and 75 g/ton of feed (3 ppm) in the third study. All the chicks received feed either with or without Flavomycin from day one to day 49. It was based on a cereal-soya mixture and was given *ad lib.*

The results of weekwise body weight, FCR and mortality recorded during the observation period of seven weeks clearly indicated that the Flavomycin 40 at 4 ppm level improved the weight gain 2.85% (2.7 – 3.7%), FCR 3% (2.07 – 3.93%) and mortality 17.5% (12.6 – 22.58%). The corresponding figures of improvement with 3 ppm of Flavomycin 40 are 1.098% 1.66% and 2.19% respectively. The Flavomycin at 3 or 4 ppm level in feed further indicated an interesting, benefit of quite a bit drier faecal droppings which reduced wet litter conditions thus making houses healthier for birds and more pleasant for the producer.

It is therefore concluded that incorporation of Flavomycin 40 in broiler mash significantly improves the performance of the birds.

Effect of Flavomycin 40 on the performance of broilers at 49 days

	Control	Flavomycin Group	% Improvement due to Flavo
Trial I			
No. of chicks	3000	3100	
Live Wt. (g)	1350	1400	+ 3.7
FCR	2.29	2.2	+ 3.93
Mort (%)	6.2	4.8	+ 22.58
Trial II			
No. of chicks	2610	3000	
Live Wt. (g)	1330	1350	+ 1.5
F C R	2.222	2.176	+ 2.07
Mort (%)	4.92	4.3	+ 12.6
Trial III			
No. of chicks	2000	2020	
Live Wt. (g)	1365	1380	+ 1.098
F C R	2.4	2.36	+ 1.66
Mort (%)	5.93	5.8	+ 2.19

The Bombay Society For The Prevention Of Cruelty To Animals.

Introduction:

The Bombay SPCA was founded in 1874, one hundred and twenty years ago. A large number of philanthropic persons, businessmen and merchants came together and raised funds and awareness, for the establishment of the Society and the construction of the historic Bai Sakarbai Dinshaw Petit Hospital for Animals in Parel, Bombay. It is governed by an Executive Committee with a President at the head, who is usually an eminent personality like the past President, the Late Mr. J.R.D. Tata. The present President is Mr. Ratan N. Tata with Mrs. Shirin R. Mody, an ardent animal lover, as Vice President.

The Bai Sakarbai Dinshaw Petit Hospital for Animals.

It has a 24 hour O.P.D. and ambulance service to attend to animals casualties, within Greater Bombay. The hospital is systematically divided into various wards for different animals and birds, with separate isolation wards for infectious and contagious diseases. It has a modern, air-conditioned, sterile operation theatre, an air-conditioned and carefully monitored I.C.U., X-ray Department, E.C.G. facility and a spotlessly clean kitchen serving fresh, wholesome food and catering to every animal's taste and need more than 60% of the total cases treated are given absolutely free medical attention. The hospital is now in the process of constructing an electric crematorium, separate Pathological Laboratory, Cardiac Centre and a Blood Bank. When functional, this Blood Bank for animals will be the third in the world and the first of its kind in Asia, after one in U.S.A. and Australia.

Field Work:

The Field Staff of the Bombay S.P.C.A. is busy outdoors and there is always much to be done. These include educational lectures, audio-visual slide shows for students and adults. Animal Welfare should be a national movement and without awareness, there can be no positive results. To encourage kindness and consideration towards animals, field trips to the hospital are organised so that the invitees can see the suffering of the inmates. Officials of the Bombay SPCA have spoken on Radio and T.V. and given press reports in an effort to spread the message of kindness towards animals. The BSPCA agents, though few in number, considering the size of this city, are vigilant at various points in the city, where cruelty towards animals is more likely to be perpetrated. These include slaughter houses, dog pounds, markets, pet shops, rail and road heads and beaches, where horses and camels are used sometimes mercilessly, to provide joy rides for children and adults. Surprise checks and raids are undertaken at stables, cattle sheds, dairies and circuses when they visit the city. The Society receives a great many complaints from concerned individuals about acts of cruelty. These are promptly and thoroughly investigated, and necessary legal action is resorted to. Free First Aid is provided to the animals at the beaches and recreation centres in and around the city. Here too, the B.S.P.C.A. officials talk to the animal owners and try to change their careless and indifferent attitude, into one of concern and love for these hapless creatures, who are in reality the bread winners.

Mrs. Banoo N. Cama, Trustee – BSPCA handing over medicines for first aid donated by The Royal SPCA for earthquake relief to BSPCA Secretary, Lt. Col. A. R. Nageshkar.

Express Help:

When disaster struck Latur and Osmanabad Districts (In Maharashtra State) in late September 1993, the B.S.P.C.A. wasted no time in going to the rescue of the earthquake-hit animal victims, This was the first time in the history of the country that such a large scale operation was carried out for animals struck by natural calamity. The relief team visited village after village, providing first aid, operating critical cases, salvaging trapped cattle, administering life-saving drugs and carrying out mass vaccinations to curtail the risk of epidemics. It was indeed a creditable venture, but would never have been possible without the help of the pharmaceutical companies, who donated enormous amounts of medicine and surgical supplies at a moment's notice. One of the largest contributions was Hoechst. We shall remain ever grateful to them.

The Society's ambulances also go to the aid of animals trapped in stable fires and bring them to the hospital for treatment.

The Italian Connection

In mid August '93, 37 year old, professor of Italian Literature Ms. Ivana Barazzoni arrived at the White Field Ashram in Bangalore. This was her first visit to India. She being an animal lover was greatly saddened by the large number of stray dogs around. Among these dogs, she found one, who was quiet, patient, friendly and always ready to share his food with the others. He was black with two white patches on his head and she called him "Chipler". On the 3rd of September '93, her visit ended and she caught a taxi for the airport, Chipler chased the cab and showed no signs of giving up. Ivana, as you can imagine was crying and she asked the driver to stop the cab, she got out, hugged Chipler and promised him that she would return to take him back to Parma, Italy with her.

Ivana returned to Bangalore on 24.12.93, but not before making all the arrangements back home with local vets, airport authorities, police, Vet. Hospital etc. She had made about 100 copies of Chipler's photos and as soon as she got to the Ashram, she handed over the photos to all the local children and paid each of them to locate Chipler. After searching for

Ivana with Chipler at The BSPCA.

6 days, Ivana finally found Chipler on 30.12.93 dying in a garbage dump in an adjoining village. He was covered in mange, except for the 2 patches on his head, his legs had open sores and needless to say he was reduced to skin and bones. She hardly recognised him. She carried him back to where she was living, Ivana called in a Vet treated him for his illness. She reached Bombay on 4.1.94 morning and started her hunt for a room. Not a single hotel or lodge would house her after having one look at the poor, miserable Chipler. She went to the Airport on 5.1.94 night to catch the flight to Rome, but was not allowed to board because of her dog. She returned to Colaba and started walking the streets in desperation trying to find some succour. She stumbled upon a well known veterinarian who in turn directed Ivana to a member of the B.S.P.C.A. At last, she was in safe and caring hands. Chipler was cleaned, bathed, medicated, Ivana too was able to relax at last and she to sat down and related her incredible story. Later that night the B.S.P.C.A. ambulance took Ivana and her precious Chipler to the airport. We got a lot of help from friends and Air India's officers.

Ivana caught her plane to Rome and so did the quiet, composed Chipler. The B.S.P.C.A. received a call from Ivana on 8.1.94 at 8.45 A.M. (I.S.T) to say that she and the dog had arrived safely and were comfortably settled into Chipler's new home.

As this fairy tale-like story ends what can we at the B.S.P.C.A. say? There is so much, but words could never be adequate – so let's just say that this is love and honesty of the greatest kind and as the brave Ivana said simply in her own words "A Promise is a Promise".

God Bless them both.

ABSTRACTS.....

Cross Protection Against Four Species Of Chicken Coccidia With A Single Recombinant Antigen

A cDNA clone So7' from *Eimeria tenella* was inserted into the high expression vector pJc 264 and was expressed as *Escherichia coli* as fusion protein che Y-So7' with 36000 MW. The purified recombinant antigen-single dose without adjuvant – not only protected against severe coccidiosis induced by infection with *E. tenella*, but also protected chicks, challenged with heterologous species *E. acervulina*, *E. maxima* and *E. necatrix*. Western blot analysis of sporulated oocysts of all 7 major species of chicken coccida, that all the species contained proteins characteristic of B class of antigens of which che-Y-So7' is representative. It seems likely that a single B antigen could protect chickens against severe coccidiosis caused by infection with any of these Eimeria species. To date however, B antigen immunization, although remarkable for a single recombinant protein, is not sufficient to compete with prophylactic chemotherapy.

Crane, M.S.J.; Goggin, B.; Pellgrino, R.M.; Ravino, O.J.; Lange, C.; Karkhanis, Y.D. Kirk, K.E. and Chakraborty, P.R. (1991). ..... Infection and Immunity 59(4) : 1271-1277.

Mycobacterial Infections In Cats And Dogs.

In New Zealand, since 1974 *Mycobacterium bovis* was diagnosed in 73 domestic cats and 3 feral cats Vs only 2 dogs. Non healing skin lesions on legs, shoulder, flank, inquinal region, lymphadenopathy (Mandibular and Mesenteric nodes) are common signs in cats. Although *M. bovis* causes disease in man which is indistinguishable from that by *M. tuberculosis*, the spread of infection from cats to man is not documented. *N. avium* complex which is wide spread in environment and birds may cause generalised fatal infections in immunosuppressed cats, dogs and human beings. In the latter it is the most common secondary infection to AIDS.

de Lisle, G.W. (1993). Surveillance 20(4) : 24-26

New Concepts In Managing Pet Allergies

The clinical signs of allergic diseases, inflammation and pruritus are observed when cumulative allergen load exceeds the disease threshold.

Typical contributing hypersensitivities include flea bite allergen, atopy and food hypersensitivity. Because these are synergistic, it is often possible to put the patient below the pruritic threshold by focussing treatment on a single aspect of allergen load.

The offending allergen, e.s. flea bite, should be eliminated when possible. In case of food hypersensitivity wherein offending protein cannot be easily identified. Use of high quality highly digestible protein in food would be useful since such protein is less likely to present an intact antigenic site.

Corticosteroids are effective antipuritics but may have adverse effects.

NSAIDS are not useful in managing hypersensitivity diseases in dogs and cats.

H_1 antihistamines may be beneficial but H_2 blockeen can increase pruritus as the latter have negative feed back role in suppressing inflammation.

Hyposensitization is ineffective for fleabite dermatitis, food hypersensitivity and contact dermatitis.

Feeding diets with 5 to 10 ratio of omeg 6 fatty acids to omeg 3 may permit reduced corticosteroid and antihistamine dosages.

Adjunct therapy includes shampoos, cool water rinses to remove cutaneous antigens,

moisturizers to restore skin integrity, topical corticosteroids and treatment for secondary infection.

Rienliast, G.A. and Carey, D.P. (1993). Vet Forum 40-43.

Left Sided Abomasal Displacement (LDA) In Cattle

LDA is typical in first six weeks of lactation in housed, deepchested, high yielding HF and Jersey cows in 3rd to 6th lactation.

High level concentrate feeding, Hypocalcaemia, inflammatory conditions, fever, distending gravid uterus, predispose the conditions.

Poor milk yield, poor appetite, ketone odour to breath, inaudible ruminal sounds, high pitched resonant ping on percussion of the dorsal left flank especially in the cranial third of the paralumbar fossa, under the last 3-4 ribs, a fluid line – are clinical findings of LDA Rectal examination useful in ruling out most the common differential diagnosis for LDA.

Mulville, P. and Curran, N. (1993)... Vet. Surgeon 15(7, 8) : 21-23.

Effect Of Periparturient Anthelmintic Treatment On Milk Yield Of Dairy Buffaloes In Subtropical Western India.

The effect of anthelmintic treatment on milk production of dairy cattle being controversial the authors state that positive effects will be greater in those herds where husbandry situations lead to moderate to heavy levels of intestinal parasitism.

Treatment of buffaloes orally with Fenbendazole at 7.5 mg/kg body weight four times at interval of 30 days commencing 15 days prior to expected parturition (Periparturient period) resulted in 9.2% gain in milk yield over control during February, March calvings and 16.4% in September-October calvings.

The greater positive effect in September-October calving is perhaps due to seasonal improvement of fodder quality that was fully exploited by treated animals than controls.

Sanyal, P.K.; Singh, D.K.; and Knox, M.R. (1993)...Buffalo Journal 3: 265-270

The Uptake Of Fenbendazole By Cattle And Buffalo Following Long Term Low Level Administration In Urea-molasses Blocks.

Urea Molases blocks are good as Fenbendazole carrier (0.5 gr./kg of block) to achieve a low and sustained plasma concentration of active metabolites of the drug. The medicated blocks made by worm process gave stable plasma oxfenbendazole concentration at 0.2 mg/ml ir cattle and 0.12 mg/ml in buffaloes from 6 days of feeding. The bio-availability of Fenbendazole was reduced in blocks made by a hot process.

Sanyal, P.K.; and Singh, D.K. (1993).... Veterinary Research Communication 17: 137-142

On Pharmacokinetics Of Fenbendazole In Buffalo And Cattle

Concentrations of Fenbendazole and of drug metabolites in plasma were measured in buffalo and cross bred cattle after single intraruminal administration at two different doses. Plasma concentrations of the parent compound Fenbendazole and the two metabolites viz. oxfendazole and fenbendazole sulfone were much lower in buffalo compared with cattle at dose of 7.5 mg/kg as indicated by lower are under concentration curve and concentration maximum. At dose of 15 mg/kg body weight there were corresponding increases in plasma metabolite concentrations in cattle. However, buffaloes did not show a similar corresponding increase.

Sanyal, P.K. (1994)... J. Vet. Pharmacol.

The Blue Cross Book for the Veterinary Profession
Hoechst India Limited
Hoechst Centre,
54/A Sir Mathurdas Vasanji Road,
Andheri (E), Bombay-400 093