

# Current concepts in the management of production diseases in dairy cattle

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The term production disease was coined by Payne (1972) for such diseases which are the result of unabated production mostly during post-parturient period. It comprises not only metabolic diseases but also other conditions which causes an imbalance between the rates of input of dietary nutrients and the out put of production. It is currently popular to explore for methods of predicting the occurrence of production diseases well in advance, so that preventive measures can be considered. The metabolic profile test is based on this concept and mixed feelings are expressed about the practical usefulness of the system. All of these metabolic disorders except udder oedema were directly interrelated. In the same manner, variations in the type of disease occur. This creates problem in the medical management of the metabolic diseases. The objective of this paper is to review the current practices in the clinical management of commonly occurring metabolic diseases and to discuss the related problems faced by the field veterinarians.

## Bovine parturient paresis

Parturient paresis is acute to peracute flaccid paralysis of lactating dairy cow usually occurs 12 hours of parturition as a result of acute depletion of serum ionized calcium. It should be considered as an emergency and is ultimately fatal unless calcium therapy is instituted

There are three discernible clinical stages of parturient paresis. Cows with serum calcium lower than 7.5mg/dL should be considered hypocalcemic. Animals with serum calcium levels of 5.5 to 7.5mg/dL may show signs of stage one hypocalcemia. Stage two hypocalcemia may be seen with calcium levels of 3.5 to 6.5 mg/ dL. Calcium concentration may fall to as low as 2 mg/dL in stage three. Determination of serum calcium is particularly important in animals those do not respond to therapy. However this test is expensive and usually does not available to the practitioner.

Hypocalcemia is associated with many other conditions, including uterine prolapse, dys-

tocia caused by uterine inertia, retained foetal membranes, abomasal displacement, mastitis and metritis. Nonparturient hypocalcemia can occur secondary to rumen overload, diarrhoea on lush pasture, oxalate rich diet or feed deprivation. Transportation stress may also precipitate hypocalcemia.

## Treatment

1. The standard treatment of parturient paresis is intravenous administration of calcium borogluconate. A rule of thumb for calcium administration is 1 gm. of calcium per 45 Kg of body weight. Most solutions are available as 500 ml bottles containing 8 to 11 g of calcium.
2. In large heavily lactating cows a second bottle administered subcutaneously may be beneficial. Subcutaneous treatment alone should be avoided.
3. Under dosing of calcium increases the chance of incomplete response, with inability of cow to rise or relapse.
4. Avoid over dosage and too rapid intravenous injection.
5. Subcutaneous or intraperitoneal administration is preferred in cows with severe toxemia due to pneumonia, metritis, mastitis etc.

## Unusual reactions

1. In all cases of intravenous injection of calcium close watch should be placed on the circulation.
2. In normal circumstances over 10 to 20 minutes should be taken to introduce the standard dose.
3. If there is sudden increase in heart rate the injection should be stopped temporarily.
4. Intravenous atropine has been used to abolish cardiac dysrhythmias associated with calcium administration.
5. Ten percentage Mg  $\text{SO}_4$  (100ml) can be administered rapidly to antagonize cardio excitory effects of calcium

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dextrose and 25% fructose have been used as an attempt to prolong the hyperglycemia.

3. A slow infusion of 20 litre of 25% dextrose (with half normal saline) over 24 hrs. Urine is monitored by dipsticks for decreasing levels of ketone bodies several times daily.
4. Glucocorticoids are often used to prolong the hyperglycemic effect by decreasing tissue uptake of glucose and reducing milk production for up to 3 days. Dexamethasone (0.04 mg. per kg) and Betamethasone are most commonly used.
5. 125 to 250 g of propylene glycol orally twice daily in combination with infusion of 10 to 20% glucose solution.
6. Low doses of long acting insulin (200 I.U. of protamin zinc insulin) subcutaneously, once in every 48 hrs may be used as adjunct to intravenous glucose and glucocorticoid therapy. Ruminants are relatively insulin resistant during early lactation and pancreatic secretion of insulin is reduced in ketotic cows in response to intravenous infusion of glucose.
7. Propylene glycol drench 225g bid for 2 days and 110g. daily for 2 days.
8. Glycerol - 500g. bid for up to 10 days.
9. Sodium propionate - 125 to 250 bid orally.
10. Sodium lactate - 360g. bid orally.
11. Lipotropic agents such as choline (25 to 50g daily) orally.
12. Cystamine - 750mg every 2 to 3 days
13. Ionophores like monensin orally.
14. In patients those continue to be hypoglycemic after several administration of glucose and oral precursor, may be treated with glucocorticoids (10mg. dexamethasone given intramuscular) and insulin (200 units long acting PZI subcutaneously)

## Downer cow syndrome

A downer cow is one down for at least 24 hrs without apparent reason for being down. The essential findings in the syndrome were that all cows had an initial clinical episode suggestive of milk fever but showed an unsatisfactory clinical response to calcium borogluconate therapy even after two successive calcium therapy.

A high incidence of downer cow syndrome (DCS) has been observed among the cross bred cattle of Kerala. Medical treatment of this syndrome has not been noticeably successful. Hence it is always better to identify the risk factors to avoid them so as to prevent the occurrence of disease.

Following are some of factors identified as the cause for the development of the syndrome.

1. Traumatic injuries of the medial thigh muscles of nerves and tissues around the hip joint.
2. Unsteady hind legs during the parturition resulting 'spreadeagling' hind legs.
3. Forced to get up or walk on a slippery floor immediately before or following parturition.
4. Difficult parturition
5. Prolonged recumbency (more than 4-6 hours) after an overlong delay in the treatment of hypocalcemic parturient paresis.
6. Serum electrolyte imbalance or deficits
7. Hypokalemia with hypophosphatemia is the most commonly quoted cause in the creeper cows which are bright and alert and crawl about, but are unable to rise.
8. Acute focal myocarditis is reported in some cases. The cause of the myocardial lesion is unknown but the repeated administration of calcium salts has been suggested.
9. Almost all cases had significantly lower erythrocytic and plasma potassium concentration.

## Treatment

Many treatments are attempted empirically in downers without consistent success.

1. Injection of magnesium salts, phosphates, corticosteroids, stimulant tonics and vitamin E and selenium have been used.
2. Use of solutions containing potassium, calcium, magnesium and phosphorus have been recommended.
3. Full dose of calcium plus 30 ml. of sodium acid Phosphate, 120 ml. of glucose(I.V) and 30 ml. Magnesium sulphate given S.C.
4. It has been recently shown that 1 $\alpha$ , (OH) D3 (a synthetic analog of vitamin-D3) is effective in cows which do not respond to calcium therapy ( 1microgram/ kg body wt. half I.V and half I.M.)
5. Attempts for slinging are usually unsuccessful unless the cow is partially able to get up on her own.
6. Provide the most comfortable bedding possible and to turn the cow from side to side several times daily.
7. There is a need to develop a field technique for the provision of physiotherapy in the form of muscle massage to restore the normal muscle activity in the affected limbs.

## Hypomagnesemia

Hypomagnesemia is a magnesium ion deficiency of the blood and cerebrospinal fluid. It is highly fatal affecting only ruminant species. Hypomagnesemia is usually accompanied by hypocalcemia. Lactation, stress, transport and / or anorexia are usually associated with development of clinical signs. The varied clinical syndrome can be categorized under the grass tetany, winter tetany and tetany in milk fed calves housed indoors.

## Treatment

Treatment is often not successful if the cow is already comatose. Intravenous administration of a commercial calcium

borogluconate solution with 5 % Mg. hypophosphate is the treatment of choice. Commercial solution containing Potassium should be avoided. Slow administration is advised.

Administration of 200 - 300 ml. of 20 % Mg. Sulphate solution by subcutaneous injection has also been advocated. Clinical improvement should occur in 3 - 5 hours. Tranquilisation may be necessary if severe convulsions are evident.

A Mg. -rich enema is alternate therapy. 60g. of magnesium-chloride(Mg.Cl2 6 H2O) in 250-500 ml. of warm water result in rapid absorption of Mg.

Since exogenously administered Mg equilibrates slowly across the blood brain barrier as many as 20% of the treated cow die during convulsion despite prior therapy.

Relapses are common within 3 to 6 hours of treatment, this animal must be monitored following therapy. Subcutaneous administration of 50%Mg Sulphate solution (125 to 150ml) may prevent relapse but a hypertonic solution such as this may result in a tissue slough.

## Fatty liver syndrome

The term Fat Cow Syndrome and Fatty Liver Syndrome are often used as synonyms. Fatty liver syndrome is a common problem due to a generalised mobilisation of fat from body depots to the liver. It occurs because of a sudden demand of energy in the immediate post-partum period in the lactating cows. There is a rapid loss of body weight. This produces a syndrome in which the affected cattle are susceptible metabolic, infectious and reproductive problems. This condition has also been called pregnancy toxemia of cattle.

In dairy cattle the fat cow syndrome usually occur in the first few days following parturition. The affected cow do not respond to treatment and become totally anorectic. She may also become recumbent and develop a severe form of ketosis, which doesnot respond to usual form of therapy. Affected cows will not eat and

gradually become weaker, totally recumbent and die in 7 to 10 days. Some cattle exhibit nervous signs consisting of a staring gaze, holding the head high and muscular tremors of the head and neck. Terminally there is coma and tachycardia.

### **Treatment**

In general cows which are totally anorexic for 3 days or more will die, those which continue to eat even a small amount will recover with supportive therapy and nutrition. There is a slight transitory response to parenteral treatment with glucose, calcium and magnesium salts. Glucocorticoids, vitamin B12 and Co are also used but the response is unsatisfactory.

Continuous intravenous infusion of glucose, electrolyte solution and the intraruminal administration of rumen juice (5-10 liter) from normal cows will become an attempt to stimulate the appetite of affected cows. The oral administration of propylene glycol will promote the glucose metabolism. The use of insulin (zinc protimine) at 200-300 i.u. subcutaneously daily will promote peripheral utilization of glucose.

The use of choline chloride at a dose rate of 25g. every four hours, subcutaneously or orally has been recommended for the treatment of severe cases.

### **Low milk fat syndrome**

The secretion of a normal volume of milk but with its milk fat reduced, often to a less than 50% normal described as low milk fat syndrome (LMF). LMF is influenced by several factors including nutrition, tempera-

ture, humidity, genetics and the cows stage of lactation. It is assumed that a decreased formation of acetate in the rumen is the cause of a depletion of fatty acid precursors and fall in butterfat. Feeding high grain low roughage rations, reduced size of hay and low fibre diet are described as the dietary cause for LMF.

The following measures can adopt to prevent LMF.

1. Forages should not be chopped too fine.
2. The ration should contain proper ratio of concentrates and roughages.
3. Hay and other roughage, should be fed before grains are fed to achieve better buffering of the rumen.
4. If milk fat is depressed, high fibre feeds should be incorporated in to grain mixtures.
5. Increase in the feeding frequency will prevent the milk fat depression.
6. Oral supplementation of 2.5-5% acetic acid will improve the milk fat percentage temporarily.

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technique and good quality semen would be sufficient to correct the infertility. Hormonal treatment should be resorted to only when it is really warranted. Synchronization of oestrus with progestogens and prostaglandins can be adopted with advantage to treat and control infertility and also to augment fertility in dairy cattle.

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### **Conclusion:**

In the management of infertility it is imperative that detailed history and clinical examination of the reproductive tract is done before instituting any treatment. In doubtful cases it is necessary to repeat the examination. Simple management such as proper time of insemination adopting correct

# Treatment of Parasitic Diseases in Domestic Animals

S. Abdul Rahman

## Drugs used in the treatment of Parasitic Conditions

	Chemical Name	Trade Name	Dosage
<b>A. TREMATODES</b>			
1. Liverflukes and Amphistomes	a) Hexachloroethane	Hexathane (Sarabhai), Avlothane (ICI), Fairmethane (Fair Deal) Fasciolax (Oriental)	C, B, 15-45 g/animal S, G, 5-15 g/animal
	b) Hexachlorophene	Distodin (Pfizer) Flukin (Arex) Flukin Forte (Arex) Flukaphene (Ethicare)	C, B, 20 mg/kg S, C, 10-15mg/kg
	c) Salicylanilides and substitute phenols		
	i) Nitroxylin	Trodax (M & B)	C, B, 10 mg/kg s/c
	ii) Rafoxanide	Rafox (Alved) Ranide (Dynamic Pharma) Amfamide (Merind)	S, G, 20 mg/kg s/c C, B, S, G, 7.5 mg/kg
	iii) Oxclozanide	Zanil (ICI)	C, B, 10 mg/kg
	d) i) Closantel	Zyclos (Cadila)	5 mg/kg p. os 10 mg/kg p. os
	e) Benzimidazole		
	i) Albendazole	Albonil (Alved) Analgon (Wockhardt) Albendazole (Wockhardt) Albendazole (Glaxo) Valbazen (Eskayef)	C, B, 15 mg/kg S, G, 7.5 mg/kg
	ii) Triclabendazole	Fascinex (Cibrageigy) Triclamar (Glaxo)	C & B, 12 mg/kg p. os 10 mg/kg p. os
C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig			

## Drugs employed in the treatment of Parasitic Conditions

	Chemical Name	Trade Name	Dosage
<b>A. TREMATODES</b>			
	Nasal Schistosomiasis	(Sterling Lab, Hosur)	100 mg/kg orally thrice at weekly intervals
	a) Oxclozanide		
	a) Sodium Antimony tartrate	(Rajesh Chemical Co.)	C, B, 1.5 mg/kg in 10% glucose saline thrice daily for 2 days i/v. or 2 mg/kg twice daily for 2 days, i/v
	b) Antimony potassium tartrate	Tartametic (Ethicare)	2 mg/kg daily for 6 days i/v.
	c) Lithium Antimony thiomalate	Anthiomaline (M&B) and Indian Immunologicals	20 ml/animal I/M followed by 15 ml weekly for 2 weeks
	d) Praziquantel	Droncit (Bayer) Cestonil (Alved)	C, B, 20 mg/kg oral S, G, 60 mg/kg oral
<b>B. NEMATODES</b>			
	Ascarids (Roundworms)		
	Piperazine compound	P. adipate (IDPL Oriental, ICI, KAPL)	100-300 mg/kg for all species of animals
	a) Piperazine adipate		
	b) Piperazine Hexahydrate	P. hexahydrate (Ventri, Merind, TTK Pharma) Helmacid (Glindia) Piperex (Sarabai) Antepar (B. Wellcome) Vermex (Pfizer) Piperazine (Merind)	
	c) Piperazine citrate	Helmazan (Noel) Pipsenna (Inga) Ballworm (Balloun)	
	*d) Avermectins	Ivermectin - (Ivomec - Dynamic Pharma)	C, S, H, D, 0.2 mg/kg P, 0.3 mg/kg
C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig; * also effective against strongyles lungworms, bots, lice, maggots and mites			

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## Drugs used in the treatment of Parasitic Conditions

	Chemical Name	Trade Name	Dosage
<b>C. STRONGYLES</b>			
1. Stomach worms, hookworms, nodular worms and whipworms	Fenbendazole	Fenzole (KAPL) Panacur (Hoechst) Fencur (Torrent) Panfugal (Merind) Curamint (Sarabhai)	C, S, 5 mg/kg    5 mg/kg bodyweight
	Albendazole	Kalbend (KAPL) Albonil (Alved) Albomar (Glindia) Valbazen (Eskayef) Endoban (TTK Pharma)	C, B, H, S, G, P 5 mg/kg D 10-25 mg/kg    
	Thiabendazole	Thiabendole (MSD) Mintezol (Merind)	C-66 to 110 mg/kg S-45-90 mg/kg D-50 mg/kg Poultry-300 mg/kg
	Mebendazole	Kalmeben (KAPL) Mebendazole (IDPL) Robendol (TTK) Wormin (Cadila) Zodex (Concept) Vermitel (Astra-IDL) Besantin (Khandelwal)	C,S 15 mg/kg H 8.8 mg/kg D 22 mg/kg Poultry 2g/28 kg feed     
C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig			

## Drugs used in the treatment of Parasitic Conditions

	Chemical Name	Trade Name	Dosage
<b>C. STRONGYLES</b>			
1. Stomach worms, hookworms, nodular worms and whipworms	Imidazothiazole	Thiophanate (M & B)	C, S, G 50-100 mg/kg
	Levamisole hydrochloride	L-Mezole (Vetcare) Helmax (Balloun) Lemasol (Ranbaxy) Helmonil (Alved) Levasol (Vetpharma) Leval (Merind) Nilverm forte (IEL) Wormal (Microlab) Vertrimisole (Ventri) Vermisol (Khandelwal)	C, S, 7.5 mg/kg         
	Tetramisole	Curamint (Sarabhai) Nilverm (IEL) Deverm (Ethicare) Ascaris (Mercury) Jetomisol (Ethnor) Nilzan (Imkemex)	C, S, G, P-35-50 mg/kg     
	Morantel	Banminth II (Pfizer)	C, S 10 mg/kg
C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig			

## Drugs used in the treatment of Parasitic Conditions

	Chemical Name	Trade Name	Dosage
C. STRONGYLES			
Hookworms & Tapeworms	Albendazole & Praziquantel	Praziplus (Petcare)	300 mg + 25mg - 1 bolus for 10kg b.wt.
Hookworms of dogs	Disophenol	Ancyol (Cynamid)	D, 7.5 mg/kg
	Bephenium Hydroxynapthoate	Alcopar (Cadila)	D, 2.5 mg/kg
Spirocerca lupi	Disophenol	Ancyol 45 mg (4.5%)	D, 0.22 ml/kg
	Diethylcarbamazine citrate	Banocide (Welcome)	D, 20 mg/kg
		Hetrazan (Cynamid) Unicarbazan Forte (Unichem)	
Eye worms of cattle	i)	Tetramisole or levamisole at the regular dosage orally or parenterally are effective as these drugs are excreted through the lacrimal glands	
	ii)	2 ml of levamisole injected into the sub conjunctival sac is also effective	
	iii)	1% levamisole solution or 4% Morantel tartrate or 1% tetramisole solution can be used as eye lotion	
Lung worms	Broad-spectrum anthelmintics such as Tetramisole, Levamisole, Morantel, Fenbendazole, Albendazole and Ivermectin are effective as against lungworms at the dosage mentioned earlier.		
Filarial worms	Levamisole-12 mg/kg orally for 4 days		
Parafilariasis	Nitroxynil (Trodax)-20 mg/kg Repeat after 72 hrs.		
(Haemorrhagic nodules)	High doses of Fenbendazole daily for 4-5 days, Ivermectin at 200 µg/kg b. wt.		
Stephanofilariasis	Levamisole, 7.5 mg/kg oral, 18.2% soln. 1 ml/25-35 kg, SC or IM Ivermectin, 0.2 mg/kg		
Onchocercosis	Diethylcarbamazine, 5.8 mg/kg for 21 days Ivermectin 0.2-0.5 mg/kg		
C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig			

## Drugs used in the treatment of Parasitic Conditions

	Chemical Name	Trade Name	Dosage
C. CESTODES			
a)	Praziquantel	Droncit (Bayer) Cestonil (Alved)	D-5 mg/kg, S-10 mg/kg
b)	Dichlorophen	Cestophene (Pearl chemicals) Dicestol (M & B) Piya (Piya)	D, 200 mg/kg
c)	Niclosamide	Nichosan (Biddle Sawyer)	C, S, G-110 mg/kg Poultry-100 mg/kg D-150 mg/kg
		Niclex (Alved)	C,S, G-1 g/15 kg Poultry-1 g/5 kg adult birds D-1 g/7.5 kg
d)	Fenbendazole	Panacur (Hoechst) Panfugal (Merind)	C-5 mg/kg S-10 mg/kg
e)	Hexachlorophene		Poultry 50-100 mg/bird C, D-20 mg/kg
f)	Dibutyltin dilaurate		Poultry 1.5-1.75 gms/kg in feed
g)	Albendazole	Tineacare (Vetcare)	S-2.5 mg/kg
		Valbazen (Eskayef)	C-5 mg/kg
		Albomar (Agrivet)	
C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig			

## Drugs employed in the treatment of PROTOZOAN diseases

	Chemical Name	Trade Name	Dosage
<b>A. ANAPLASMOSIS</b>			
	1. Oxytetracyclines	Oxysteclin (Sarabhai) Terramycin (Pfizer)	C, B-5 mg/kg i/m for 5 days
	2. Tetracycline hydrochloride	Steclin (Sarabhai)	C, B-5 mg/kg i/m for 5 days
	3. Chlortetracycline hydrochloride	Achromycin (Cynamid)	
<b>B. BABESIOSIS</b>			
	1. Diminazine aceturate	Berenil (Hoechst), Torrent	3.5 mg/kg s/c.
	2. Acriflavin 1% soln.		100 ml i/v daily for 4 days for cattle and horses
<b>C. THEILERIOSIS</b>			
	1. Quinine compounds (Malaquin, Nivaquin, Camaquin) are effective against only against intraerythrocytic forms but not against schizonts		
	2. Tetracycline - (Oxytetracycline, chlortetracycline, Rolitetracycline) have suppressive effect when given during the incubation period and initial parasitaemia.		
	3. Menoctone (Sterling winthrop, New York)		
	4. Halofuginone lactate (Stenorol (Hoechst - W. Germany)		
	5. Buparva-quone (Butalex - Cadila) 1ml/20kg b.wt.		
	6. Vaccine (Rakshavac-T-Indian Immunologicals)-Attenuated schizont infected lymphoblasts of Theileria annulata.		

C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig

## Drugs used in the treatment of PROTOZOAN diseases

	Chemical Name	Trade Name	Dosage
<b>C. TRYPANOSOMIASIS</b>			
	1. Quinapyramine	Tevansi (Ranbaxy) Triquin (Wockhardt) Suracide (MJ Pharma) Tribexin prosalt (IDPL) *Quintrycide prosalt (Gharda) Corridan (HAL) Trypnil (Merind)	C, B, S, G, Camels 5 mg/kg Quinpyramine sulphate (therapeutic) Quinpyramine chloride (prophylactic)
	2. Sulphonated naphthylamine Suramin	Naganol (Jagat chemicals)	
	3. Diamidines Diminazene aceturate	Berenil (Hoechst) Diminazine aceturate (Torrent)	C, S, G, 3.5 mg/kg SC or IM
	4. Substitutes	Tartaremetic (Ethicare) Anthiomaline (M & B)	1 ml/10kg, IV 15-20 ml/animal IM

C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat



## Drugs used in the treatment of COCCIDIOSIS in poultry

Chemical Name	Trade Name	Dosage (ppm)
1. Amprolium	(Amprolium - Merind)	125-250
2. Nitrofurazones + Furazolidone	(Bifuran - Eskayef)	0.0082
3. Nitrofurazone	Avicox (Microlabs), Bicox (Agvet), Coxysol (Alved), Dozone (Sarabhai), Furanitro (Piya), Thearsol (Agvet), Koxcare (Vesper), Mifuran (Medicine, India), Poultrifuran (Aries), Vetsfuran (Vets Farma)	
4. Clopidol (pyridinole)	Amfedol (Ranboxy), Clopidox (Microlabs), Coccilium (Wockhardt), Coxidol (Ventri), Coymix (Agvet), Coden (MJ Pharma), Clopcare (Farmcare), Klop (Sarabhai), Mericlop (Merind), Regecoccin (Anfeed)	125-250
5. Amprolium + Ethopabate	Bancoxy plus (Microlab)	
6. Dinitrotoluamide	Cocciwin (Sarabhai), Coxidot (MJ Pharma, Dot (Aries), Dot care (Vetcare), Dotstar (Farmcare), DOTCI (Bluecross) Super-dot (Vetcare)	
7. Dinitolmide	Coxyban (Agvet), Ethcoxi (Concept), Galidot (Teeyem), Zonamix (Piya)	
8. Monensin	Elancoban (MJ Pharma), Femiz (Merind), Coban (Ventri)	
9. Halofuginone	Stenorol (Hoechst)	2-3
10. Tetracyclines	Codrinal (Hoechst)	
11. Sulpha drugs	Sodium Sulphadimidine - DimDim (Ar Ex Lab Dimidine (IDPL) Sulphaquinoxaline sodium. Paquin (Ranboxy) Sodium sulfadimethylpyrimidine - Sulmet (Cynamid)	
12. Dinitolmide	Ethcoxy (Concept)	
13. Lasalocid	Avatec (Piramal)	75-125
14. Salinomycin	Coxistac (Pfizer)	50-70
15. Maduramycin	Cygro (Cynamid)	5
16. Robenidine	Gycostat (Cynamid)	33

C=Cattle; B=Buffalo; H=Horse; S=Sheep; G=Goat; D=Dog; P=Pig

## Some commonly used insecticides (Ectoparasiticides)

Common name	Trade Name/formulation	Use for controlling	Manufacturers
<b>Organochlorines</b>			Many companies
Hexachloro-cyclohexane (HCH)	Benzene hexachloride (BHC)	Mange mites, blowflies, etc.,	
Lindane	Gammexane 20EC 20 EC or 25 WP	lice, ticks -do-	Mico Farm chemicals & others
<b>Carbamates</b>			
Carbaryl	Sevin 5% or 50 WP Notix	Lice especially in poultry, poultry mites, fleas, flies	Union Carbide, Petcare
<b>Organophosphorus Compounds</b>			
Malathion	Cythion & Others	Flies, lice	Cynamid and Others
Fenitrothion	Sumithion 25EC 50EC	Lice, fleas mange mites, ticks	Rallis, India Tata-Fison
Diazinon	Neocidal 20EC and other	Mange mites, ticks, lice	Hindustan Ciba-Geigy
Trichlorfon	Neguvon	Warbles, ticks, mange & Poultry mites, fly larvae in wounds (maggots)	Bayer
Coumaphos	Asuntol 50 WP	Lice, ticks, maggots	Bayer (India)
Dichlorovos (DDVP)	Nuvan 100 EC	Flies, horse bots, ticks, poultry pests	Hindustan Ciba-Geigy
Chlorpyrifos	Dursban	Ticks, particularly in cattle.	Dow Chemicals