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Immunity break - down in Animals vaccinated with Commercial Foot - and - Mouth Disease vaccine

(Received for publication on December 10, 1978)

S. Pyakural

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Nepal.

Unlike rinderpest foot and mouth disease (FMD) does not cause heavy casulty in local stock but the loss inflicted by this disease is of no less significance. It is estimated roughly that annual loss incriminated by this disease, in terms of reduced meat and milk production, decreased efficiency in work of draught animals and mortality in young ones comes to nearly 25 to 30 percent.

FMD is one of the oldest disease known in Nepal but so far it has received little or no importance among the live-stock problems of the country, and hence the work done for the investigation or control of FMD is of little or no significance.

Plurality of strains involved in the symptomatic manifestation attributable to FMD has made it obligatory to do prior typing of the viral strains available in the country before introducing effective control measures. Due to technical and financial short-comings Nepal is not so far able to afford to type the FMD viruses prevalent in the teritory. The only authentic typing work published from this country was in 1972 (Pyakural 1972) which has indicated the presence of O and A types of the virus in Kathmandu. Besides, few other materials received from FMD cases have also revealed only these two types (unpublised observation). Since last few years vaccination against FMD is being done in a routine way in improved and

cross breed animals in and around Kathmandu. Immunity break-down in FMD vaccinated stock is of frequent occurrence. This communication deals with one of such breakage in immunity in one mixed herd of cattle and buffaloes.

Experimental and Results

In February 1978 20 animals of artificial breeding (AB) centre, Kathmandu which comprise Jersey and Brown Swiss bulls, cross bred cows, Murrah buffalo-bulls and Murrah cross buffalo-cows and one hariyana bull, were vaccinated with commercially produced FMD vaccine (Hoechst Pharmaceuticals Ltd., Bombay India).

Since March 1973 these animals received one dose of FMD vaccine annually as prescribed by the manufacturer. Of 20 animals vaccinated one bull revealed typical foot-and-mouth lesions after 4 months of vaccination. Other symptoms displayed by the bull were high fever (105°F) and off feed. None of the other animals, in contact were infected in this outbreak.

Epithelium of tongue and gum which were ready to slough off were collected in phosphate buffered saline (Ph 7.2). Part of the material was minced thoroughly and inoculated in the foot-pad of guinea pigs. The rest of the material was sent to Animal virus research Institute (AVRI) Pirbright, U. K. for conformation.

Vesicles were noted in guinea pigs at the site of inoculation. In preliminary typing the virus was proved to be type O. Also AVRI confirmed the virus as type O.

Discussion

FMD is generally considered to be an enzootic of domestic and wild cloven hooved animals (FAD/UNDP report to the Government of Kenya 1972) but occasional incidence of natural outbreak in elephant is also reported (Pyakural Singh and Singh 1976).

Vaccination against FMD came into effect in this country when improvement in local breeds of cattle by artificial insemination (AI) was introduced since last few years. At this stage vaccination is restricted to the animals of Government Livestock farms and those of the private breeders who get F1 cross from AI.

So far the knowledge of the types of virus prevalent in its territory is concerned Nepal is still in dark. Although earlier communication pointed out the presence of type O, and A (which also include one sub-type A 22), (Pyakural 1972), this report can not however depict a comprehensive picture about the existence of FMD virus types and sub-types of the length and breadth of the country. Being bordered with India it is assumed that the virus types prevalent in Nepal could be similar to those present in the subcontinent, Nepal is extensively using the polyvalent vaccine produced in India. Although it is not a fruitless exercise, technically it is always advisable to have idea about the virus types present in the territory of the country. In the present condition Nepal can not speculate the possibility of the availability of the virus types other than these four which are commonly present in the whole of the Asian subcontinent but we can be

equally optimistic to have less these 4 types of virus. If it is so, production cost of the vaccine could be lowered to a considerable extent.

Another interesting observation made in this experiment was that the virus involved in this outbreak belonged to type O. As stated earlier we are still ignorant about the types of viruses present in the country as a whole. However, this has given sufficient indication to speculate that type O is probably more prevalent than other types in Nepal. This is because the previous communication (Pyakural 1972) also indicates that of 22 materials typed 15 fell under type O, 5 under type A and two were untypable. In addition to that the virus isolated from FMD cases of elephant also belonged to type O. Similar findings have also been reported from India (Dhanda and Gopal Krishna 1961, Dutt, Rao and Sharma 1968, Dutt, Natarajan, Rao, Negi and Goel 1969). Circumstantial evidence has, so far, suggested the presence of O, and A type of FMD virus in Nepal, but this has not altogether ruled out the presence of other types and subtypes of FMD viruses which are normally available in the adjoining Indian territory. As stated in the previous communication (Pyakural 1972) Nepal should immediately give attention towards the establishment of National FMD virus typing laboratory prior to launch any mass FMD control programme. However, so long the local viruses are not typed the use of Indian vaccine may not be a futile adventure.

Summary

Of 20 animals vaccinated of AI centre Kathmandu, one Jersey bull developed FMD after 4 months. The virus involved in this outbreak was type O.

Acknowledge

The authors are grateful to Dr. A. C. Gupta, Chief AI centre, Kathmandu for this help in collecting the material from the infected animal. The authors also would like to express their gratitude to the Director AVRI for the confirmation of the typing result.

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Evaluation of Crude Protein Level in Rabbit Nutrition

(Received for publication on February 15, 1977)

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Introduction

In the underdeveloped countries rabbits are least considered as cheap source of meat production. This might be due to less information available in this class of livestock. It is wellknown that rabbit is a multiparas animal with large litter size and has faster growth rate upto slaughter weight in a minimum period of time. Under well managed conditions rabbits can be grown more economically feeding ad libitum green grasses and restricted concentrate. Properly balanced concentrate is required in its nutrition in order to meet the limiting amino acid requirements - methionine could be the first limiting amino acid in case of rabbit. (Shrestha - previous experiment). Large number of rabbit litters have been distributed from Pakhribas Agricultural Centre hoping rabbit could become excellent source of meat supply in the hills. In

order to support this activities it felt necessary to know the actual protein level requirement. So an experiment is designed to evaluate the percentage of crude protein level required in rabbit nutrition.

Materials and Methods

Sixteen unsexed four weeks old rabbit litters immediately after weaning were randomly housed in a shed which had provision of 10 equal sized rooms (5 rooms in two rows). In order to control environmental effects the central two rooms of both rows were kept vacant and on either side 8 rooms were only used. Two rabbit litters were allocated to each room. Diets were randomly allocated so that two groups of rabbit litters received each of four diets. Experimental diets and water were supplied ad libitum and 200 gms of green para grass (*Brachiaria Mutica*) leaves was

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supplied daily to each room during the whole experimental period. Rabbits weight and feed consumption were determined weekly.

Experimental Treatments

Soyabean and maize are the only grains available in the hills to feed livestock. Soyabean is used as the principal source of vegetable protien in these diets. 4 diets of 4 different levels - 21

percent, 18 percent, 15 percent and 12 percent crude protien were constructed using roasted, grinded soyabean and grinded local maize. The series of diets contained equal quantity of limestons, bonemeal and common salt but bond to contain different quantity of energy and amino acid. Details of trails of treatment diets composition, local cost per Kg diet and calculated chemical composition of all diets are given in Table I.

Table 1: Composition, local cost per kg diet and calculated analysis of series of treatment diets.

Diet		2	3	4
Dietary Protein Level	2 %	18%	15%	11%
Maize grinded	52.069	62.414	72.759	83.103
Soyabean roasted/grinded	42.931	32.586	22.241	11.897
Limestone	1.500	1.500	1.500	1.500
Bonemeal	3.000	3.000	3.000	3.000
Common Salt	0.500	0.500	0.500	0.500
Local cost NC Rs/kg diet	2.68	2.58	2.53	2.48
Calculated analysis	3.232	3.213	3.194	3.175
Energy Kcal ME/gm				
Calcium %	1.45	1.47	1.49	1.51
Phosphorus %	0.79	0.76	0.72	0.69
Salt %	0.56	0.57	0.57	0.57
Methionine	0.58	0.60	0.62	0.64
Cystine	0.32	0.27	0.21	0.15
Lysine	1.13	0.91	0.68	0.45
Arginine	1.46	1.23	0.99	0.85

N. B.:- Maize @ NC Rs 2:50 per kg
 Soyabean @ NC Rs 3:00 per kg
 Limestone @ NC Rs 0:72 per kg
 Bonemeal @ NC Rs 1:00 per kg
 Common Salt @ NC Rs 0:50 per kg

Results and Discussion

The rabbit litters used in this experiment were fairly uniform in size. The average initial live weight difference between highest and lowest group of rabbit litters was 50 gm. One rabbit receiving 12% crude protein containing diet from one

block was died during seventh week of the experiment giving 6.25% mortality rate. Table 2 summarises values for mean live weight gain, food intake and efficiency of food utilization and cost of rabbit meat production.

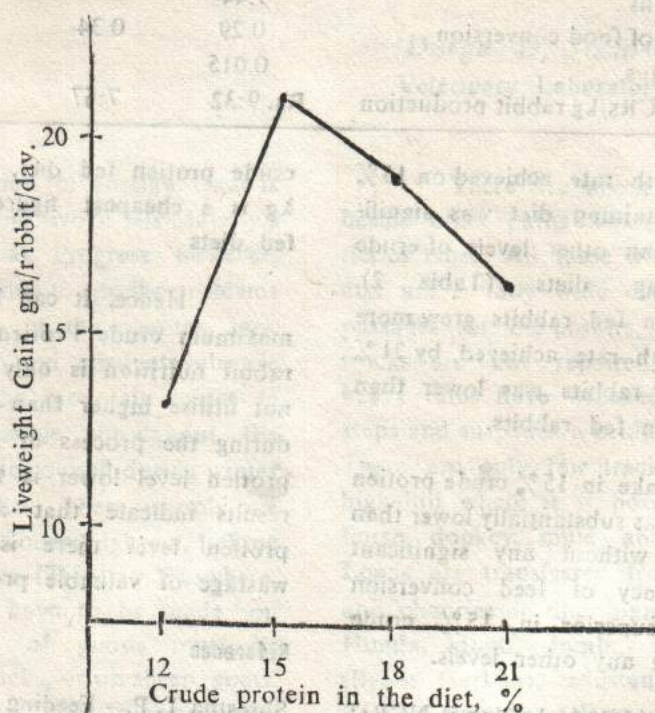


Fig.-LIVEWEIGHT GAIN

Table 2: RESULT OF THE EXPERIMENT

Diet	1	2	3	4
Percentage of Protien	21	18	15	12
Average Liveweight gain at Ten weeks	kg 1.744	1.908	2.078	1.528
Initial Liveweight	kg 0.600	0.570	0.563	0.613
Net gain	kg 1.144	1.338	1.515	0.915
Average daily gain	kg 0.016	0.019	0.022	0.013
SE of means	6.57			
Total feed Intake	kg 3.978	3.978	3.975	4.125
Average daily feed Intake	kg 0.057	0.057	0.057	0.059
SE of means	7.44			
Efficiency of food conversion	0.29	0.34	0.38	0.22
SE of means	0.015			
Cost of NCRs/kg rabbit production	Rs. 9:32	7:67	6:64	11:18

The growth rate achieved on 15% crude protien containing diet was significantly superior than other levels of crude protien containing diets (Table 2). 12% crude protien fed rabbits grew more slowly. The growth rate achieved by 21% crude protien fed rabbits was lower than 18% crude protien fed rabbits.

Food intake in 15% crude protien containing diet was substantially lower than any other levels without any significant differences. Efficiency of feed conversion was significantly superior in 15% crude protien level than any other levels.

Cost of rabbit production is NCRs: 6:64 per kg at 15% crude protien fed diet whereas NC Rs: 9:32 per kg at 21%

crude protien fed diet. NCRs: 6:64 per kg is a cheapest figure than any other fed diets

Hence, it can be concluded that maximum crude Protien requirements in rabbit nutrition is only 15%. Rabbits cannot utilise higher than this level of protien during the process of growth. Higher the protien level lower is the growth, these results indicate that above 15% crude protien level there is degradation and wastage of valuable protien.

Reference

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Livestock Trade Between Tibet (China) and Nepal (From 1956/57 to 1970/71)

(Received for publication on March 10, 1978)

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The expansion of foreign trade is one of the major objective of His Majesty's Government of Nepal. Progress however, is not satisfactory due to specific problems like, the topography of the country, lack of transport facility and adequate electric power. Moreover, the mountain routes to Tibet are not accessible throughout the year, the passage being closed during winter due to heavy snowfall. There is only one motorable road, the Kodari highway, linking Kathmandu to Lhasa (Tibet)¹. Elsewhere, trade and journey have to be made on foot and all types of goods must be carried either on backs, or on sheep, goats, horses, yaks, chauries and other pack animals. However, most of the trekking is done by men because tracks are too steep and rivers are wild and difficult to cross for animals. At least, at the moment there is no air link between Kathmandu and Lhasa.

There are about nine major routes beside other paths which lead to the frontier of Tibet. All these tracks are very old and are usually wide enough for two way passages for the porters. However, as these tracks are not repaired, landslides and heavy rains have wrecked the pavements, steps and suspension bridges at many places. There are only few tracks in mid-hill and high-hill where it is possible to use pony, horse, donkey, mule and other animals. Loads are transferred from porters to yaks and chauries in the high altitudes, such as Humla, Mugu, Jumla, Dolpa, Darchula (Byans Garkha), Mustang, Thum, Thak Khola, Namche, Olangchung Gola, etc.

Nepal's foreign trade till 1956 was limited entirely to India in the South² and Tibet in the north. Since 1956, overseas trade is expanding gradually. More than 90%

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of Nepal's trade is limited with India in Tarai, where most of Nepal's exports are produced and where access to Indian rail-heads is easy by the motorable roads^{4, 5}. On the other hand trade with Tibet, which can be reached only by tracks leading across a few high passes, is negligible in comparison to India.

After the establishment of Tibet as autonomous region of China in 1956, the revised treaty and agreements facilitated both the countries to establish trade in each other, and to make pilgrimage to places in either countries.

The first trade agreement signed in September 20, 1956, was ratified in January 17, 1958. The second trade agreement was concluded in May 19, 1964 and was valid for two years from the date of agreement. The third trade agreement was made in May 2, 1966, and was to be valid for a period of ten years. The fourth revised and ratified trade agreement was concluded in May 19, 1968 and was to be valid for a period of two years.

Livestock Trade Commodities:

Livestock commodities regularly exported to Tibet comprise live animals chauries, she and he buffaloes and cattle, etc., ghee (clarified butter) raw bovine hides, raw sheep and goat skins, some woollen readymade goods and foot wears.

Imported commodities from Tibet comprise live animals like yaks, naks, Bhyanglung sheep, and Chyangra goats (Pashmina goats), horses, mules, dogs, etc., raw sheep wool, Yak tail, carpets (woolen), raw sheep and goat skins, musk and woollen fabrics.

The trend of livestock and livestock trade between Nepal and Tibet in the last 15 years from 1956/57 to 1970/71 is shown in Table 1.⁷ The balance of trade is always seen to be on the deficit side and the exported value, in comparison to the imported value, is always declining in nature. Raw hides and skins of buffaloes, cattle and goats are exported by Sherpa traders in considerable quantities to Tibet where the price of hide (buffalo) was several times higher enabling one load of hides to be exchanged for 3 loads of salt.⁸ Other than live animals and raw wool, various kinds of animal products such as butter, dried meat (mutton), hides and sheep skins used to be imported from Tibet. Trade in these products has not been encouraged these days. At one time wool, as well as live sheep (Bhyanglung sheep) and Chyangra goats used to rank next to salt on the list of exported goods from Tibet to Nepal. Today, however, the wool trade has also shrunk and only limited quantities of wool come from Tibet.

Table: 1 Trend of Livestock Trade between Tibet and Nepal in the least 15 years.

Fiscal Year	(Value in Rs)			
	Import	Export	Deficit	Surplus
1956/67	19,51,958	8,970	19,42,988	-
1957/58	2,16,000	81,000	1,35,000	-
1958/59	2,76,361	1,08,798	1,67,563	-
1959/60	20,26,691	2,779	20,23,912	-
1960/61	33,83,340	1,29,579	32,53,761	-
1961/62	40,68,356	1,67,004	39,01,352	-
1962/63	48,83,000	63,000	48,20,000	-
1963/64	44,52,000	5,65,000	38,87,000	-
1964/65	24,61,000	7,34,000	17,27,000	-
1965/66	56,78,000	9,59,000	47,19,000	-
1966/67	40,21,000	96,000	39,25,000	-
1967/68	15,00,000	4,23,000	10,17,000	-
1968/69	18,91,000	8,17,000	10,74,000	-
1969/70	6,98,000	4,72,000	2,26,000	-
1970/71	28,24,000	4,38,000	23,86,000	-
Total	4,03,30,706	50,65,130	3,52,65,576	-

Source: Foreign Trade Statistics, CBS; National Planning Commission, HMG, Nepal.
 Joshi, Durga D. (1978). Livestock Trade Statistics of Nepal (From 1956/57 to 1974/75). in Press.

Livestock trade records of Nepal and Tibet are collected by the Central Bureau of Statistics from the following customs offices of HMG, Nepal, which are established in the Nepal-Tibet boarder (Table II).

Table II.
Custom offices at Nepal/Tibet Boarder

S. No.	Customs Offices	District
1)	Tinkar	Darchula
2)	Mugu Chhirne	Mugu
3)	Thak Dang (Nelchung)	Mustang
4)	Lambagar	Gorkha
5)	Rasuwa Gadi	Rasuwa
6)	Tatopani	Sindhupalchok
7)	Namche	Solukhumbu
8)	Olangchung	Taplejung
9)	Sirdibas	Gorkha

Trade with Tibet is confined to two seasons of the year.

- (1) Autumn - from October to November.
- (2) Early Summer - from May to June.

Tinker (Darchula), Namja pass (Mugu), Nara pass (Humla) and Nangpa La pass (Solukhumbu) are all snow bound from late November until May and during the monsoon the journey is far from human approach. Traders go twice to Tibet between April and September. The Sherpa towns of Jalbire near the Kuti Pass and Namche Bazar near the Nangpa Las pass, supply commodities to the Tibetians.

Present Livestock Trading Pattern with Tibet:

As long as there was an open frontier between Nepal and Tibet, Livestock

trade occupied a central role in the business activities of Sherpas and other Bhotias of Nepal. The exports of Nak, wool and dried mutton from Tibet to Nepal is non-existent, and the export of Chauries from Nepal to Tibet is rarely undertaken. The present trading pattern with Tibet is going in deficit because of the following reasons:

1. Production of Chauries for sale has become less profitable, and this is reflected in the size and composition of Yak and Chauries herds kept by the people of northern alpine regions.
2. Tibetan traders find it impracticable to bring their goods to Nepal and sell them to Sherpa and other Bhotia traders.
3. There has been a breakdown in the long-standing personal contact between big, medium and small merchants of both the countries.
4. In 1959, a large number of Tibetan refugees entered in Nepal and stayed in the frontier region for 5-6 years. Initially, the whole frontier was completely closed but, later, limited trade of few basic commodities such as wool, salt and grain was allowed by the Chinese authorities. However, according to the trade agreement concluded in 1966 between China and Nepal, a few locally authorised Sherpas and Bhotias who were permitted visa, to be allowed to go up to Gingri (Dingri) for business - through the official trade route.

5. Livestock trade is usually conducted in barter system, where, according to the Sherpas, the present rate of exchange is much less favourable. Consequently, such trade has fallen.
6. At present most of the young Sherpas both boys and girls - who are the real breeders of Yaks, Naks and Chauries in Nepal, have switched their traditional profession in favour of employment with foreign mountaineering expeditions. The mountaineers and tourists recruit Sherpas as member of their expedition, as porters, guides and camp servants. As a result of which the earning of Sherpas and Bhotias from such employment have replaced the gains derived from the trade with Tibet.⁹

Today, many famous trading centres near the Nepal - Tibet boarder, such as Tukuche in Thak Khola of Mustang district, Tarakot and Chharka Bhot (Tasharka Bhot) of Dolpa district, Mugu gaun of Mugu district, Yari Limi and Dzinga of Humla district, Byans Garkha of Darchula district, Namchebazar of Solukhumbu district and Olangchung Gola of Taplejung district of Nepal, are no longer the important focal points of the business activities of the trans-himalayan trade.

Acknowledgement

Author is grateful to Dr. B. P. Dhital, Executive Director, Agricultural Projects Services, Centre, for his keen interest and encouragement and he is also thankful to Mr. Pramod Pal, Editing

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Studies on Essential Aminoacid Composition of the Eggs and Day Old Chicks

(Received for publication on January 15, 1979)

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Keeping in view the great role of proteins and aminoacids in nutrition, the present investigation has been aimed at to estimate five essential aminoacids in eggs and in breast muscle tissues of day old chick in order to evaluate their protein quality and also to study any significant difference in the pattern of these aminoacids in eggs and in the day old chick muscles of the same breed.

Estimation of aminoacid in Eggs and in Muscle Tissues of Day Old Chick:

The method of Block and Zweig (1958) was adopted for the preparation of hydrolysate from the dehydrated sample of whole egg and day old chick muscle of the same breed. 100 mg. of the samples were obtained from three different sample of eggs and pooled muscle samples of the day old chicks and were hydrolysed separately. The hydrolysates were dissolved in

2 ml. of 10 percent isopropanol in glass distilled water.

Taking 10 microlitre in duplicate each hydrolysate was spotted in chromatographic filterpaper, 10 microlitre of reference aminoacid mixture was also applied on either side of the chromatogram. The chromatogram was developed in solvent (Butanol-Acetic acid and water) for 20 hours. After redevelopment of the chromatogram ninhydrin was sprayed. The ninhydrin spot of the different hydrolysates were compared with the corresponding ninhydrin spots of the reference aminoacid mixture. The resolution of the different hydrolysates were thus identified. The spot of lysine, arginine and phenylalanine were cut separately and the spot of leucine-isoleucine was cut together because of nonseparation of these aminoacids. Each ninhydrin spots were then eluted in 4 ml. of 75 percent ethylalcohol containing

2 mg. of copper sulphate. The optical density of each eluate was determined in Klett Summerson Photo electric calorimeter using green filter (450 mn.). The duplicate study of each amino acid under study were taken and values were averaged. From

the reading thus obtained actual amount of lysine, arginine, phenylalanine and leucine isoleucine content of whole egg hydrolysate and of muscle tissue of day old chick was ascertained with the help of respective standard curves.

Amino acid content in 100 grams of Dehydrated Ether Extracted Samples of Egg and Muscle;-

	No. of Observation	Arginine	Lysine	Phenylalanine	Leucine - Isoleucine
Egg	1	6.40	6.31	5.12	8.22
	2	6.10	9.09	4.85	8.04
	3	6.92	6.02	5.35	8.09
	Average dse	6.34+	6.14+	5.10+	8.11+
		0.012	0.027-	0.35-	0.005-
Muscle	1	6.31	8.39	4.70	11.67
	2	6.00	8.21	4.13	11.22
	3	6.84	8.67	5.78	11.87
	Average	6.38+	8.42+	4.87	11.58+
		0.83-	0.42-	0.48	0.607-

It is obvious from the above table that the estimated value of arginine in 100 grams of dehydrated ether extracted samples are almost similar in three samples. The values, are 6.40, 6.10, 6.52 and the average value is 6.34 grams.

The arginine content in egg as reported by F. A. O. Technical Committee (1967) on Poultry Products for Asia and Far East as percent of protein is 6.6. Essary et al (1968) indicated a value of 6.4 for egg. In the present study the average value of arginine in egg expressed as percent of protein is 7.7.

The arginine content in 100 grams of dehydrated ether extracted muscle tissue of day old chick in the three samples are 6.31, 6.00 and 6.84 grams and average being 6.38 grams.

William (1954) reported that arginine content in ether extracted muscle tissue of day old chick in grams per 16 grams of nitrogen as 6.69. The average value of arginine in ether extracted sample of muscle tissue of day old chick in present study is 6.81 grams per 16 grams of nitrogen. The present value and the value furnished by William as stated above is in fair agreement.

Lysine:-

The estimated value of lysine in 100 grams of dehydrated ether extracted sample of egg in the present study are 6.31, 6.09 and 6.02 grams respectively. The average being 6.14 grams. According to the report of F. A. O. Technical Committee (1967) on Poultry Products Asia and Far East and Essary et al (1968), the value of lysine in egg expressed as percent of protein are 7.0 and 7.2 respectively. In the present study lysine content in egg calculated as percent of protein is 7.48 which agrees fairly with the finding of above workers.

According to Willam et al (1954) lysine content in ether extracted muscle tissue of day old chick is 7.75 grams per 17 grams of nitrogen. The average lysine content in muscle tissues of day old chick in the present investigation is 9.98 grams per 16 grams of nitrogen. Thus the present value is slightly higher than the value reported by above workers. This minor difference in the lysine content of day old chick muscle may be due to breed difference or due to methods of estimation adopted by various workers.

Phenylalanine:-

The estimated values of phenylalanine in 100 grams of dehydrated ether extracted samples of egg are 5.18, 4.85 and 5.35 grams in three samples respectively. The average value for phenylalanine is 5.10 grams.

The value of phenylalanine in egg expressed as percent of protein is 6.3 according to a report of F. A. O. Technical Committee (1967) on Poultry Products for Asia and Far East. Essary et al* (1968) observed that the phenylalanine content of egg was 4.9 calculated as percent of protein. In the present study the value of phenylalanine in egg expressed as percent of protein is 6.69 which agrees fairly well with the F. A. O. report mentioned above. However, the findings of Essary et al of (1968) is comparatively lower than in the present investigation.

The phenylalanine contents in 100 grams of dehydrated ether extracted muscle tissue of day old chick as studied in the present investigation are 4.70, 4.13 and 5.78 gram respectively in the three sample. The average value being 4.47 grams.

The phenylalanine content in 100 grams of dehydrated ether extracted sample of day old chick muscle in grams per 16 grams nitrogen as reported by William (1954) is 4.17.

The phenylalanine content in muscle tissue in the presents study in grams per 16 grams of nitrogen is 5.19. The present value thus appears slightly higher than the value reported by above workers. The probable reasons of difference in the value of phenylalanine may be due to different breed or different analytical procedures adopted by various workers.

Leucine-Isoleucine:-

Because of Non-clear separation of these two aminoacids on chromatogram, the value of leucine-isoleucine has been considered together, while comparing the value of leucine-isoleucine in present investigation with the findings of other workers, the cumulative value of the two aminoacids has always been considered.

The leucine-isoleucine content in 100 grams of dehydrated ether extracted samples of egg in the present analysis are 8.22, 8.04 and 8.09 grams respectively in three samples. the average value being 8.11 grams. The leucine-isoleucine value expressed as percent of protein is 9.8 in the present study.

The leucine-isoleucine content of egg as has been reported by F. A. O. Technical Committee on Poultry products for Asia and Far East (1967) is 18.7 expressed as percent of protein. Essary et al (1968) gave value pf 17.2 calculated as percent of protein.

The leucine-isoleucine content in 100 grams of dehydrated ether extracted samples of muscle tissue of day old chick in the present study are 11.67, 11.22 and 11.87 grams respectively in three samples. The average value being 11.58.

The ualue of leucine-isoleucine in ether extracted muscle tissue of day old chick in grams per 16 grams of nitrogen is 11.24 (William 1954). The leucine-isoleucine content in muscle tissue of day old chick in the present study in the grams per 16 grams of nitrogen is 12.36. Thus the value observed in the present study indicates nonsignificant different with the value furnished by William et al (1954).

The value of leucine-isoleucine in egg in the present study is lower than the findings of other worker, which is difficult to explain. However, the close agreement observed in three samples of egg offers confidence on our findings.

Name of the Acid	No. of Obs.	Ave	S. E.	Difference	T. Value
Arginine	3-3	6.34+	6.38+	-	-
Lysine	3-3	6.14+	8.42+	0.04	0.11
Phenylalanine	3-3	5.10+	14.87+	2.28	10.3*
Leucine-isoleucine	3-3	8.11+	11.58+	0.23	0.04
		0.005-	0.60-	3.47	16.8*

* Donates significant at 1% level.

The arginine, lysine, phenylalanine and leucine-isoleucine in egg and muscle tissue of day old chick as shown in the above table on statistical analysis reveal that there is significant difference in the pattern of aminoacid lysine and leucine-isoleucine between egg and day old chick. No such difference is observed in case of arginine and phenylalanine. On close examination of the observation of the egg

samples, it appears that egg has a slightly higher amount of arginine and phenylalanine content than that of day old chick, which however, appears nonsignificant when subjected to statistical analysis. Even for leucine-isoleucine the higher significant value in muscle of day old chick observed in the present study may not be of real significance because of appreciably lower value for eggs obtained in the present study.

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An Epizootiological study of Bovine Pneumonia

(Received for publication on November 8, 1978)

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Pneumonia in cattle is considered to be a disease of significant economic importance in many parts of the world. A battery of bacterial, viral, and fungal enteties have been incriminated from cases of pneumonia in cattle and buffaloes. It is generally accepted that in majority of the cases stress may predispose the animals to become vulnerable to respiratory tract infection

P. multocida is known to be an important pathogen of the respiratory and digestive tract of animal, for many years. The isolation of *P. multocida* and *P. hemolytica* from pneumonic lung is not uncommon (Carter 1967). However, extensive study of viral diseases has indicated that *P. multocida* and *P. hemolytica* probably act as secondary invaders, the primary incitance of the disease being viruses like Para influenza 3 (PI 3) (Carter 1967, Gilmour 1978). Antibody response to H3 N2 influenza virus in sheep suffering from respiratory symptoms has also

been detected (Pyakural personal communication, Graves, Pyakural and Sousa, 1974)

Present study comprises the clinical epidemiological and gross and histopathological investigation of infectious pneumonia in bovines with special reference to *Pasteurella* infection in Nepal and Patna, India

Materials and Methods

Epizootiological observation: This study is based on the clinical records available from the Central Veterinary Hospital, Tripureswar, Kathmandu (CVH) for a period of 5 years (1967 through 1971). The autopsy records of 502 animals from Government Cattle Farm Patna (GCF) and 788 animals of the Department of Pathology, Bihar Veterinary College Patna (BVC) have also been incorporated in this observation. Incidence of pneumonia in animals of different age groups belonging to GCF has also been investigated.

Table I

The frequency of Pneumonia and other respiratory diseases in bovians brought during different seasons of year in the Central Veterinary Hospital, Kathmandu.

Respiratory cases treated during the months of												
Year	Jan.	Feb	Mar.	Apr.	May	June.	Jul.	Aug.	Sept	Oct.	Nov.	Dec
1967	8	6	11	9	10	9	11	25	27	30	24	21
1968	12	14	12	15	12	15	13	30	35	36	32	27
1969	21	18	17	18	20	22	15	40	46	45	39	32
1970	30	25	21	20	24	26	17	48	58	59	60	40
1971	39	33	29	26	20	22	22	35	76	105	70	50
Total	114	96	90	88	86	94	78	178	242	275	225	170

Table II

Seasonal distribution of Pneumonic lesions in BVC & GCF material

Location	No. autopsied.	No. cases of Pn. & others with Pn. lesions	Months											
			1	2	3	4	5	6	7	8	9	10	11	12
BVC	788	472	59	25	26	28	20	21	28	38	105	51	31	40
GCF	211	145	3	3	2	1	3	2	5	7	86	21	8	4

Table III

Incidence of pneumonic cases in the autopsied animals of GCF & BVC

Location	No.	Pn		Pr		Dig D		Others with Pn.		Other conditions	
		Autopsied	No.	P.c.	No.	P.c.	No.	P.c	No.	P.c.	
GCF	502	270	53.78	57	11.35	85	19.53	52	19.35	40	7.96
BVG	788	402	51.04	71	9.01	-	-	2	0.25	245	31.09

Pn- Pneumonia

Pt- Pulmonary tuberculosis

Dig D- Digestive disturbance.

Pc- Percent

Table IV

Incidence of Pneumonia in the different age groups
of Tharparkar cattle of GCF farm Patna

Total no of cases	No. autopsied	Age group of animals	Diagnosis
362	102	0 to 6 months	Pneumonia
	72	6 months to 1 year	"
	91	1 year to 3 years	"
	53	3 years to 8 years	"
	44	Above 8 years	"

Methods used for the diagnosis of Pneumonia

- 1) Clinical examination of sick animal
- 2) Bacteriological examination of materials from pneumonic cases:
 - a) Blood smear: Direct blood smears were prepared from 12 animals with symptoms of respiratory distress and pneumonia at the height of temperature and were stained with Grams and Leishmans and seen under oil immersion lens.
 - b) Isolation and typing of the organisms: Blood was drawn from the jugular vein of 12 animals brought at CVH in acute stage of infection with high fever. A few drops of blood were streaked on the blood agar slops. Few drops were also inoculated in nutrient broth. 12 Swiss mice were inoculated I/P with 0.1 ml of 18 hours broth culture at the rate of 2 mice per sample
 - c) Biochemical test: Such as sugar fermentation reaction, growth in 7% sheep blood agar, Indol production, MR and VP, reactions were also taken into consideration for the typing of the organisms.

Results

Seasonal incidence of clinical cases of pneumonia recorded at CVH are presented in Table 1. Similarly the monthly record of pneumonia in cattle in GCF and BVC are given in Table 2 and fig 1 & 2. The percentage of pneumonic cases on the basis of PM finding in BVC and GCF are submitted in table 3. Mortality in different age group animals (GCF) from pneumonia is indicated in table 4. All the 12 blood smears examined showed the presence of Gram negative cocobacillary organisms. Bipolarity was evident when stained with Leishmans.

The organisms from all the 12 cases studied resembled *P. multocida* in cultural and biochemical examination. All mice infected with over night broth culture died within twenty four hours.

Discussion

The epizootiology of bovine respiratory infection looks very complex. This is evident that the symptoms of pneumonia in animals is attributable to more than one etiological agents. The result of few bacteriological work in this experiment which

revealed the presence of *P. multocida* may probably be the secondary invader of the respiratory tract, the primary cause of infection being some viruses (Carter 1967). This however, needs confirmation,

occupies an important place among animal diseases inflicting loss in cattle wealth. Table 3 shows that the loss attributable to pneumonia in cattle in Patna is above 50 percent of the total deaths which is very significant.

The epizootiology of bovine pneumonia displayed almost similar picture both in the animal of Kathmandu and Patna. On the basis of the clinical cases reported in (CVH) as well as the autopsy record (BVC and GCF) incidence of the disease was higher during the months of September and October. This seasonal incidence of the disease is probably due to stress, produced by the cumulative effect of long exposure to humid rainy season during monsoon and the transportation of animal from Tarai to Kathmandu, which is more frequent during these months. It is noticed in the present observation, that pneumonia

As evident from Table 4 mortality due to pneumonia is highest in calves under 6 months of age than adults which is likely to be due to subnormal body resistance in low age group animals.

Acknowledgement

Author is grateful to Dr C. D N Singh, Head of the Department of Pathology B. V. College Patna for the help. Further the author is obliged to Farm manager and the staff of Government cattle farm Patna for their cooperation.

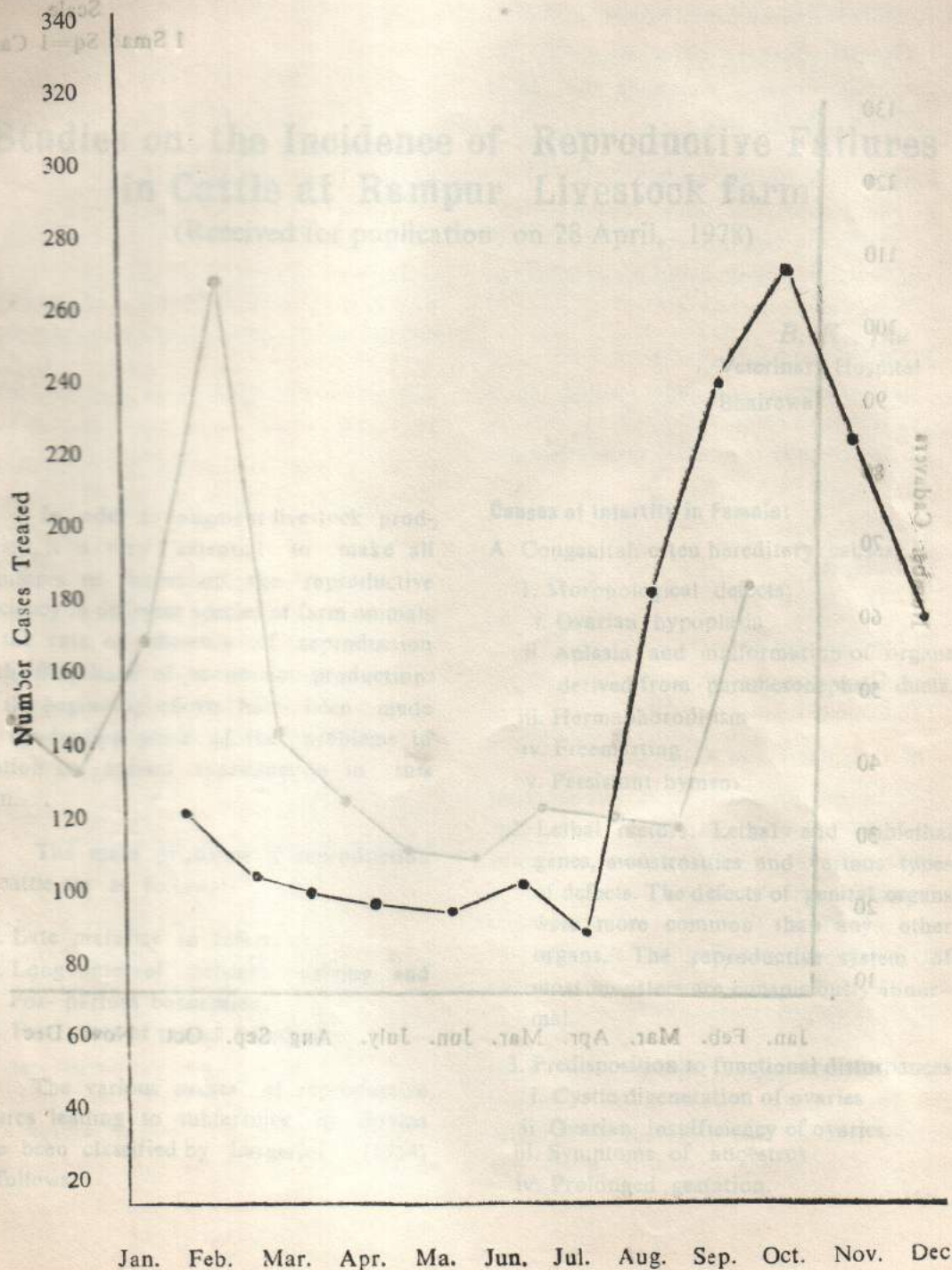
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Daig 1

GRAPH SHOWING INCIDENCE OF RESPIRATORY DISEASES IN BOVINES

Scale
1 Small Sq=2 Cases

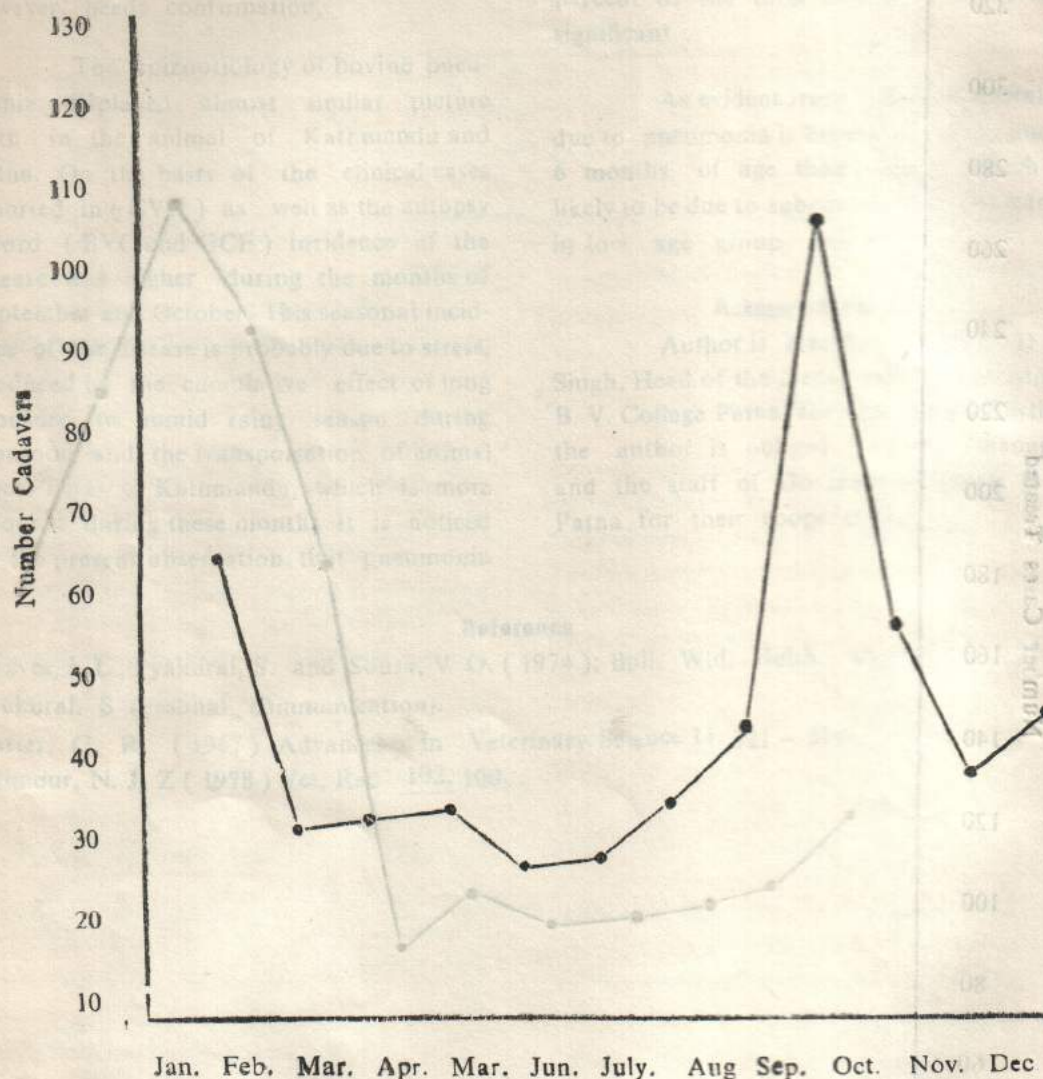


Diag 2

GRAPH SHOWING INCIDENCE OF PNEUMONIC LESION AT AUTOPSY IN BOVINES

(B V C)

Scale
1 Small Sq = 1 Case



Short Communication:

Studies on the Incidence of Reproductive Failures in Cattle at Rampur Livestock farm

(Received for publication on 28 April, 1978)

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In order to augment livestock production, it is very essential to make all attempts to boost up the reproductive efficiency in different species of farm animals as the rate of efficiency of reproduction is the first basis of economic production. In the beginning efforts had been made for conducting some of the problems in relation to animal reproduction in this farm.

The main problems of reproduction in cattle are as follows:-

1. Late maturity in hifers.
2. Long interval between calving and Pos- partum conception.
3. Few cases of repeat breeding.

The various causes of reproductive failures leading to subfertility in Bovins have been classified by Largerlof (1954) as follows.

Causes of infertility in Female:

A. Congenital, often hereditary causes.

1. Morphological defects:
 - i. Ovarian hypoplasia
 - ii. Aplasia and malformation of organs derived from paramesonephric ducts.
 - iii. Hermaphroditism
 - iv. Freemarting
 - v. Persistent hymen.
2. Lethal factors: Lethal and sublethal genes, monstrosities and various types of defects. The defects of genital organs were more common than any other organs. The reproductive system of most monsters are conspicuously abnormal.
3. Predisposition to functional disturbances
 - i. Cystic digeneration of ovaries
 - ii. Ovarian insufficiency of ovaries.
 - iii. Symptoms of anoestrus
 - iv. Prolonged gestation.

4. Chromosomal aberrations.

B. Acquired environmental causes

1. General disease (Brucellosis, T. B. Johne's disease, metabolic and deficiency diseases etc.

2. Infections of the genital organs

- i. Peripheral infections (Endometritis, cervicitis, vaginitis, etc.
- ii. Coital infections (vibriosis, trichomoniasis, Leptospirosis etc.

3. Nutritional factors.

- i. Over feeding and under feeding
- ii. Defective composition of the feeds.
- iii. Deficiencies in mineral trace elements, vitamins etc.

4. Climatic factors

- i. weight
- ii. Temperature.

5. Management factors:

- i. Heat detection
- ii. Control mating etc.
- iii. Comdination of A and B.

In the present study it was observed that late maturity in hifers and post partum interval in cattle were of mixed nature. On genital organ examination it was observed that the organs were not developed according to the age of the animal. In most of the cases the ovaries were anoestrus.

In the present study 24 cows and 10 matured hifers were examined rectally and it was observed, particularly in case of hifer that according to the age

the genital organs were not developed, as the weight of the hifere was not as per age.

The age at first heat and fertile heat in Heriana heifers have been calculated by various authors in India. As per their reports the age at first oestrus and conception has been found to be 2 years 6 months to 2 years 9 months (Johri and Talpatra 1956), the age at first oestrus as 919.0147.9 (Ahuja, 1948) 909.7 I 42.9 days (Ahuja et al 1961), 1177.50 I 20.29 days (Chaudhary et al 1965) and 29.97 I 0.42 months (Sharma et al, 1968). These are much lower as compared to the present studies in this farm as the average fertile heat in this farm is 3½ years.

The pubertal heat in heifers passes unnoticed as the natural service is practiced here, and in fertile heat only the heifers accept male and repeat breeding in case of cattle has been marked only in 2 cases in the present study. As A. I. has not been started so regularly rectal examination to find out the corpus luteum and to differentiate the pubertal and fertile heat has not been studied.

The post partum interval in the farm animals was found to be 4 months on an average taking the data of 2 years of this farm.

The reproductive problems can be controlled when the A.I. work will be started when regular routine examination of the animals will be conducted and thus

the late maturity in heifers and long post partum interval of cows can be reduced.

Apart from this good management practices, disease control and nutritional practices will enhance the production.

Acknowledgement: The author is grateful to Shri G. R. Raj Bhandari, Chief Rampur Agri Station for his support and necessary facilities.

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Short Communication:

Table

Area	Numbers Distributed	Goats Died	Cause of Death	No. of sick goats
A. Gerkhutar	25	12		2

Some disease problems in Jamunapari goats of Nuwakot District.

(Received for publication on December 6, 1977)

D. D Joshi*

Epidemiology of the disease:-

During Agriculture year 1975/1976 various species of livestock like buffalo, cattle, horse, donkey, yak, nak and poultry were imported mainly from India and distributed on low interest rate credit to the farmers of different districts of Nepal through District Agriculture Office. A flock of 52 Jamunapari goats was given to the farmers of Nuwakot on December 1975. 25 goats were gone to Gerkhutar and 28 to Tupche village. Soon after distribution these goats started dying with a complex disease problem. Within a fortnight 28 goats were dead. A team of diagnosticians were sent to do on-the-spot study of the disease from Central Veterinary Laboratory and Veterinary Hospital, Trisuli. Post mortem (P. M.) of the cadaver was done and specimen, and faecal samples were sent to veterinary laboratory for further investigation. Laboratory diagnosis revealed nothing

suggestive of any infection. However, ova of liver fluke, cestodes and Nematodes were detected in abundance. Flukicide and anthelmintics were administered to all the goats. A second team of Veterinarians from Central Veterinary Laboratory which visited subsequently prescribed terramycin injection along with anthelmintics, scabien and some tonic powder and liver extract etc, with no appreciable effect. The author also participated in the epidemiological survey team in these two places. On investigation some goats were found to have a temp. rise of 103° - 105° F, low appetite, mange infection, coughing and pneumonic symptoms (table 1). Tick infestation was also noticed in few goats. Besides, all the animals were debilitated. It was advised to continue scabien and himala-yan batisa as a tonic. The farmers were asked to clean the pen thoroughly.

*Present address: Department of Health, HMG Nepal.

Table

Area	Numbers Distributed	Goats Died	Cause of Death	No. of sick goats
A. Gerkhutar	25	12		5
B. Tupche	28	16	Pneumonia, Parasitic infestation transit sickness	6

P. M. Examination:-

On P. M. examination the following changes were noticed:-

- Peritoneal cavity-yellowish coloured fluid.
- Liver - Decomposed with few cavities on the surface, shape size and colour were abnormal. No flukes were found.
- Lung - congestion in lower lobe of left lung, some pus oozed out while pressing, no parasite was found.
- Stomach - full of gass and food stuff with foul smell.
- Intestine - small intestine was empty with scant amount of faeces. Large intestine contained liquid faeces but no parasites.
- Outer skin - Mange infestation.
- Anemic
- Heart, kidney, spleen and bladder, - Normal.

Discussion and conclusion:-

Feecal sample examination revealed that the goats had *Fasciola hepatica*,

Haemonchus infestation, *Trichostrongylus* and *Amphistomes*. In addition to that pneumonia, debility, hepatitis, cystic conditions and cachexia were noticed. It is very likely that general debility produced by these conditions may have made the animals vulnerable to pneumonia and death.

Journey stress coupled with overstocking, inadequate sanitation, mismanagement, sudden environmental changes and higher parasitic load may also be responsible for high morbidity and mortality.

Acknowledgement:-

Author is most grateful to Mr. Thapa of Tupche and Mr. Sharma of Gerkhutar, the farmers of Nuwakot, Mr. C. K. Adhikari, Officer, "Small Farmers Development project" Tupche, and Mr. P. N. Thakur, J. T. ADO office Trisuli for their assistance and help provided during investigation.

Short Communication:

Hysterectomy in goat. A case report

(Received for publication on December 12, 1978)

S. M. S. Pradhan

Veterinary Division

Tripureswar, Kathmandu

Nepal

While planning to do caesarean operation, sometimes surgeon may find the condition of the uterus worst enough because of putrefaction, so that he may have to proceed for hysterectomy. This report comprises similar operation in a she-goat.

Case history: A she-goat of local origin aged about 4 years was brought at Lumle Agriculture Centre with following symptoms:

The animal was off fed for the last two days and had a temperature rise of 105°F . The abdomen was very much distended with sick appearance and ruffled hair coat. On questioning the farmer, it was revealed that it displayed all symptoms of kidding about a fortnight before, which was the due date of kidding. However, the sign of labour disappeared after 4 days without kidding.

Diagnosis: The physical and gynecological examination of the animal coupled with

the case history led it to be the case of daystokia.

Treatment: Caesarean section was thought to be the best measure to it and hence preparation for the same was done. The goat was secured in the lateral recumbency with its right flank on the ground. The protion between the last rib and the point of hip was shaved and washed thoroughly with savlon solution.

The site: The lower part of the left flank equidistant between the last rib and the point of hip was the selected site of operation.

The techniques: Local infiltration anaesthesia using Novocain 25 ml was injected under the skin, muscles and peritonium along the proposed line of incision. After the anaesthetic effect had set in 8 inch long incision was made in usual manner incising the skin muscles and peritonium. Voluminous amount of watery exudate splashed

out as soon as the peritonium was incised. The gravid horn was pulled out near the incised opening by inserting the right hand. As the incision was given on the surface of the uterus, it was realised that the scalpel was no more needed to cut the surface of the uterus because it was putrified to such an extent that the finger could tear the mass of the uterus easily without exerting any discomfort to the animal of the surgeon. Suture work of the incised wound of the uterus was impossible due to the maceration. Hence it was decided to perform hysterectomy at the eleventh hour. By the time this decision was taken, the temp. of the animal had fallen from 105°F. to 99°F. 100 ml of calboral was injected intravenously and 100ml S/C. Also 2 ml of nikethamide was injected intramuscularly. The ovarian arteries were ligated by using chromic cat gut No 2 and the uterine artery was also ligated. Incision was given on the uterus posterior to the bifurcation and the stump inverted into the vagina. The peritonium and the muscles were sutured with continuous suture using chromic cat gut No 2 and interrupted suture was put on the skin. Sulphanilamide powder was applied on the surface of the sutured wound. By the time the operation completed, the animal was in sub-conscious state with a temp. of 96° F. Another dose of nikethamide was injected intramuscularly without

any immediate effect. The animal remained in the recumbent state for three days with temp. not exceeding 96°F. Daily treatment with antibiotics supported with glucose therapy was given for six days. The condition of the animal showed slight improvement on the fourth day of operation. The animal stood on its feet after one week of operation. However, it developed temporary lameness which could be attributed to the pressure exerted on the local nerve due to constant lying on its side for one week. This was corrected by tying a splint close to the affected feet. The suture was removed on the 10th day and the animal was discharged from the intensive care unit of the project.

Conclusion: In complicated cases of distokia where, caesarean operation may not lead to ultimate cure, hysterectomy could be an alternative to save the life of the animal. Such operation could be done successfully in local condition if proper and intensive care is taken.

Acknowledgement: The author is thankful to Mr. W D. Hughes (V. S. O.), L/stock Supervisors Kul Bahadur, Tek Bahadur and Churna Bahadur Gurung and all other livestock staffs of Lumle Agriculture Centre for helping during the operation.

News

1. Prof. Bain visited Nepal as FAO[APHCA consultant in connection with surveillance of H. S. in South East Asian countries.
2. Mr. Moure and Dr. Keley from Government of Australia visited Nepal to explore the possibility of assisting in the field of animal Health programme of His Majesty's Government of Nepal.
3. A team from Asian Development Bank came to Nepal to study the feasibility of animal production and health programme. This team was followed by a project formulation team, Who, formulated the various projects in pertaining to Animal Health and production.
4. A appraisal team headed by Dr. Phillip Young is in the capital to give the final shape to the project.
5. A team from Government of India has visited Nepal to study the possibility of livestock development specially in the Western Development Region of Nepal.
6. The General Secretary of this association Dr. Durga D. Joshi has been deputed in the Department of Health to carry out the various studies on the zoonotic diseases and to creat the Veterinary public Health Division in the same department.
7. Drs. M. D. Lohani, S. L. Shrestha, N. P. S. Karki & B. M. Shrestha have returned home after completing their masters degree in tropical Veterinary Med., Animal breeding, animal production and veterinary medicine respectively from overseas and India.

Dr. S. L. Gupta returned from Australia after completing two months training in animal health and production.

Dr. T. P. Subba left for U. K. for Masters in animals production/health.

8. Australian Veterinary Association is donating veterinary books, journals and technical papers to our association. We are thankful to that association and particularly to Dr. J. Holt.

Book Review

Animal Health, Livestock and Dairy Development statistics of Nepal by Dr. DURGA D. JOSHI, published by Agricultural Projects Services centre (APROSC) and printed in His Majesty's Government Press, Singhdarwar, Kathmandu, Nepal.

This book presents, all the possible statistical record, data and informations about animal health, livestock and dairy development in Nepal since 1938 onward. There is hardly any books published so far which could provide first hand information on the animal health, livestock and dairy development statistics of the country.

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