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(The Journal of the Indian Veterinary Association)

*A Monthly Record of
Veterinary Science*



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THE
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G. Vinayaka Murthy

President, Indian Veterinary Association
and
Editor, Indian Veterinary Journal

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April, 1962

No. 4

THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE INDIAN VETERINARY ASSOCIATION]

PUBLISHED MONTHLY



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Devoted to the cause of the
Veterinary Profession



EDITOR

Rao Sahib T. VINAYAKA MUDALIAR, G.M.V.C.,

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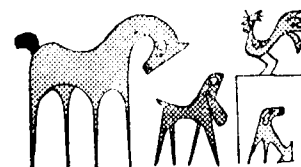
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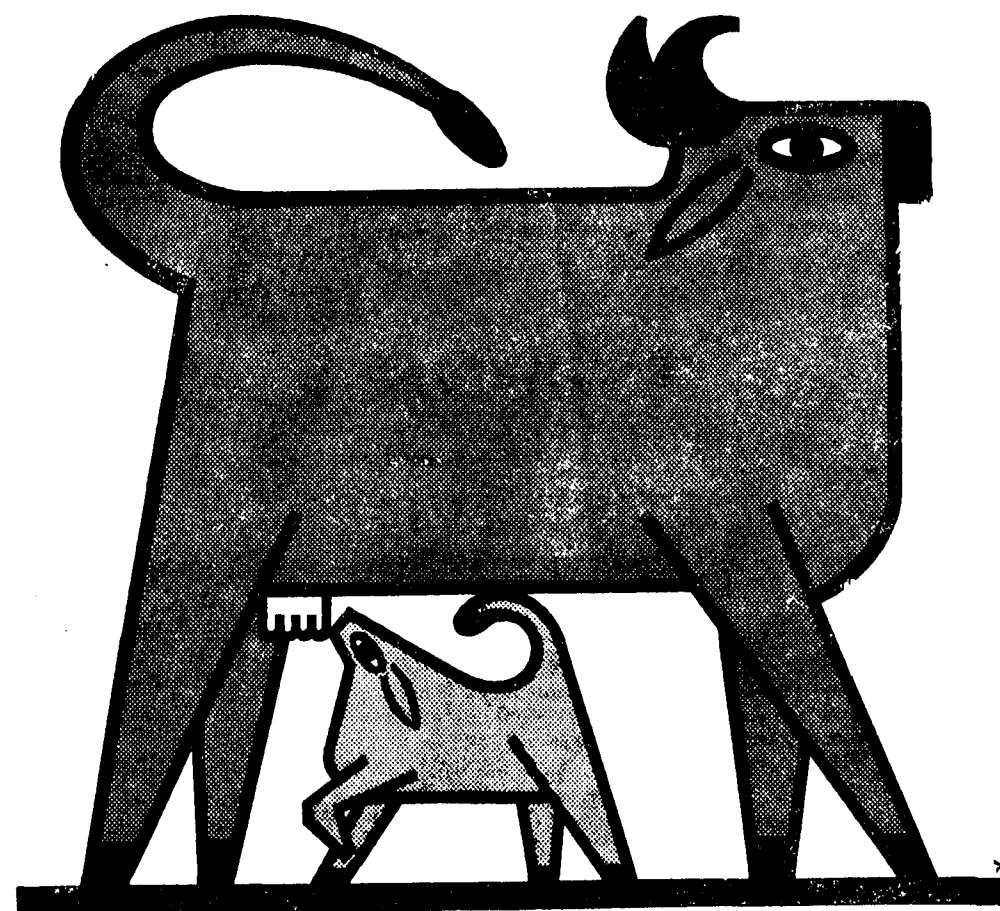
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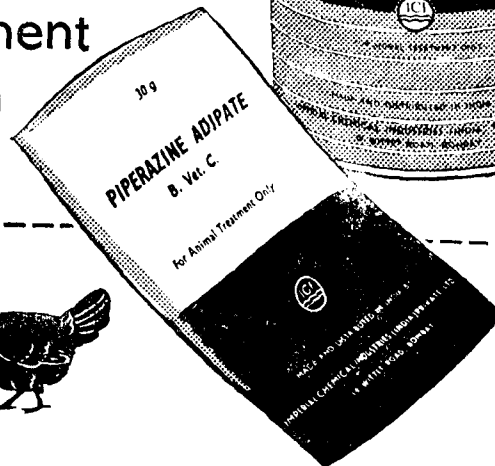
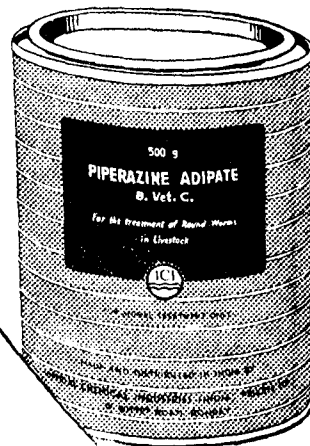
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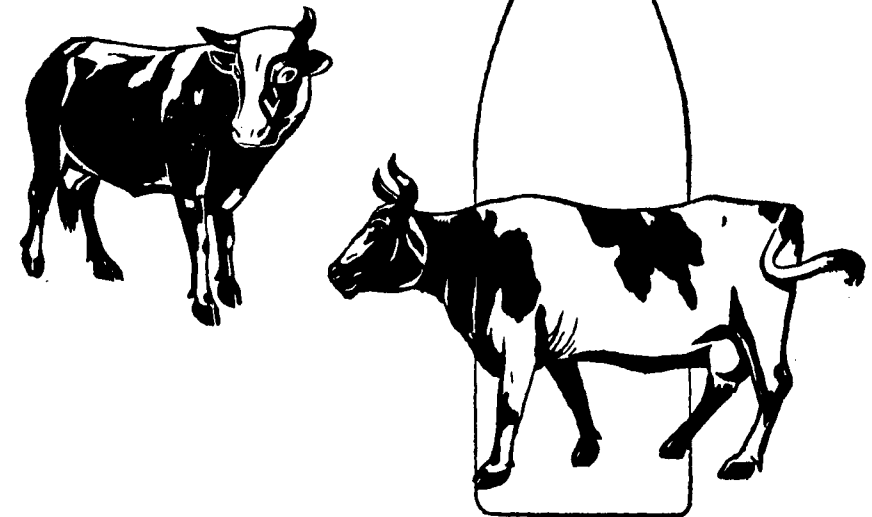


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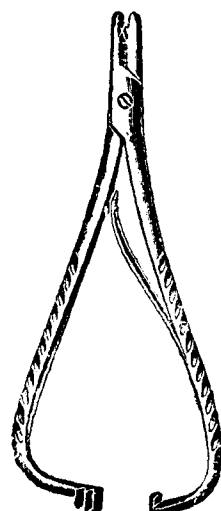
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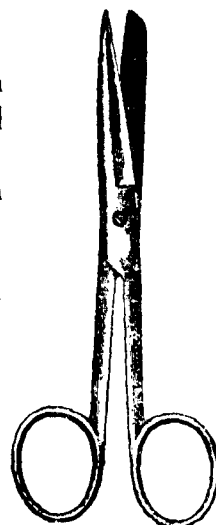


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THE

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Editorial

REPRESENTATION FOR VETERINARY SCIENCE

The Din and Dust of the election is over. The country and the Government are settling down for another period of strenuous work. The next five years are going to be a very crucial period. The Third Five-year Plan is undoubtedly a great challenge to the Nation at large. Succeed we must, otherwise India will be in very great difficulties economically. We have planned big, we must think big and act big. Our leaders are of the best in the world. None can question their patriotism and sincerity of purpose. But they sometimes seem to suffer from lack of proper perspective. They lay stress on non-essentials which can afford to wait and miss the essentials which are in urgent need of attention.

They go about proclaiming "Agriculture is now universally accepted as the foundation of economic planning in India. Animal Husbandry, in turn, is the foundation of a sound system of agriculture in the country". Thus said, no less an authority than a member of the Planning Commission, Shri Shriman Narayan Agarwala at the Fifteenth Indian Veterinary Conference at Mathura in February 1962. It is clear therefore that animal husbandry is the foundation of all foundations, if the country is to prosper on sound lines. An amount of Rs. 90 crores has been provided for under the Third Five-year Plan for different programmes of animal husbandry and dairy development in different parts of the country. As usual the programmes are in the very nature of things, good, bad and indifferent. And yet there is no provision for voicing the expert criticism of the profession in the Legislatures of the land. There is not a single representative of the Animal Husbandry profession either in the State or Central legislatures. There is a

well organised professional body, the Indian Veterinary Association which has been in existence for 40 years now and which has been running this professional Journal for an equal number of years. It is a highly respected body, both within and without the country. It has been pleading for representation on Legislative bodies but it has been a cry in the wilderness. Art, music, dance, sports etc., seem to be more lucky than Science. Veterinary Science which has been guarding, multiplying and improving the livestock wealth of the land is yet to receive such a recognition.

The Indian Veterinary Conferences have asked for such a representation. The Interim Indian Veterinary Council has asked for such a representation. This Journal has been constantly reminding the State and Central governments. Now that the time has arrived for such nominations, may we appeal to all the State Governors to nominate one representative each on their respective Legislative Council and to the President to nominate one on the *Rajya Sabha*? We call upon all State Veterinary Associations to renew their requests on this matter to their Governors. The Indian Veterinary Association will, we are sure, take up this matter with the Central Government.

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General Articles

NUTRITIVE VALUE OF ANJAN (PENNISETUM CENCHROIDES) GRASS HAY FROM GRAZING AREAS OF RAJASTHAN FORESTS

By

V. MAHADEVAN, P. S. GUPTA and M. M. JAYAL,
*Animal Nutrition Division, Indian Veterinary Research Institute,
Izatnagar, U. P.*

Anjan is a perennial grass. It grows in plains and low hills throughout Western India from Kashmir to the Upper Gangetic plain and is fairly common in south India and Rajasthan. Once established, it is not killed by droughts. This is the famous *Kolakattai* (Tamil) grass of Coimbatore district (Achariar, 1921). Other scientific names of this grass are *Cenchrus Ciliaris* Linn: *C. digynus*, Schrele and *C. Anjania*, Ham (Hooker, 1897). It is an excellent fodder grass in young stage for both cattle and horses (Bor, 1941). The data on the chemical composition and nutritive value of *anjan* hay from Punjab, Uttar Pradesh and Madras (Sen, 1946) indicate wide differences in its chemical make-up and nutritional quality. Since such scientific data in respect of *anjan* grass from semi-arid grazing areas of Rajasthan forests, where the grass grows naturally in abundance, were not available it was considered desirable to conduct feeding trials on *anjan* grass, cut and dried into hay at the flowering and post-seeding stages, from the semi-arid regions of Rajasthan.

Experimental

Two samples of *anjan* hay, one at the flowering stage and the other at the post-seeding stage, collected from the same grazing area of Rajasthan forests were received through the courtesy of Chief Conservator of Forests, Rajasthan.

For conducting feeding experiments eight adult *Kumaoni* bullocks were divided into two comparable groups in respect of age and live weight, etc., The flowering stage hay was fed to one group and the post-seeding-stage hay to the other group. Both the samples were fed *ad libitum* and formed the only source of nutrient in-take of the test animals. A free choice of water twice at 11-00 A.M. and 4-00 P.M. and one ounce of common salt daily were given to each animal. The feed-

ing regime covered 32 days of which the last 10 days constituted the metabolic period when twentyfour hourly collections of excreta were made. The left-overs of each animal during the metabolic period were collected and analysed.

The methods of analysis by A.O.A.C. were generally followed. The minerals, calcium and phosphorus were estimated according to the modified methods of Talapatra, Ray and Sen, (1940).

Results and Discussions

Chemical Composition. The chemical composition of the two samples of *anjan* hay from Rajasthan forests, on dry basis, is set out in Table I and compared with those from Punjab, Uttar Pradesh and Madras (Sen, *loc. cit.*)

TABLE I

Feeding stuff	Crude protein	Ether Ext.	Crude fibre	Nitrogen free-extract	Ash	Calcium (Ca)	Phosphorus (P)
<i>Anjan</i> hay							
(i) Flowering stage (Rajasthan)	5.520	0.822	35.590	40.412	17.656	0.428	0.210
(ii) Post-seeding stage (Rajasthan)	4.590	0.777	38.420	42.382	19.821	0.344	0.160
<i>Anjan</i> hay (Punjab)	5.730	1.500	36.690	44.250	11.910	0.140	0.140
<i>Anjan</i> hay (Uttar-Pradesh)	4.870	1.420	32.910	51.210	10.180	0.310	0.180
<i>Anjan</i> hay (Madras)							
(i) Young ...	16.890	1.140	28.490	40.780	12.700	—	—
(ii) Prime ...	10.010	1.160	35.320	42.600	10.900	—	—
(iii) Ripe ...	6.380	0.680	33.300	49.710	9.930	—	—

The data expressed in Table I show that not only the two samples of *anjan* hay from Rajasthan forests but those from U.P. and Punjab also are poorer in crude protein than those from Madras. The hay in ripe stage appears to be poor in crude protein irrespective of the place where it grows. In general the phosphorus content is somewhat low.

From Table II it will be seen that the experimental animals consumed an average of 1.56 kg. hay of the flowering stage and 1.50 kg. hay of the post-seeding stage on dry basis per 100 kg. body weight per day. For a palatable roughage the figures of consumption are somewhat low for both the samples of *anjan* hay.

Dry feed consumption of the experimental bullocks under the two feeding trials.

TABLE II
Dry matter consumption per day.

Stage of <i>anjan</i> hay	Animal No.	Body weight on dates			Average body wt. during the metabolic period (kg)	Feed Consumption per day	Consumption of hay in kg. per 100 kg. body wt. per day (kg.)
		22.3-1959 (kg)	11.4-1959 (kg)	22.4-1959 (kg)			
Flowering stage	182	192	187	185	186	2860.68	1.54
	75	192	187	185	186	3191.40	1.72
	37	227	225	223	224	3377.08	1.51
	28	218	213	211	212	3135.97	1.48
Average		207.25	203	201	202	3141.28	1.56
Post-seeding stage hay	70	194	191	189	190	2781.37	1.46
	35	192	185	183	184	2971.93	1.61
	33	226	221	219	220	3173.54	1.44
	176	216	211	209	210	3142.24	1.50
Average		207.00	202	200	201	3017.27	1.50

Digestibility and nutritive value

The digestibility coefficients of *anjan* hay at the flowering and post-seeding stages of growth are shown in Table III.

TABLE III
Digestibility co-efficients.

Stage	Animal No.	Crude protein	Ether Extract	Crude fibre	Nitrogen free-extract
Flowering stage	182	27.877	44.850	53.248	48.381
	75	27.758	33.712	55.202	51.730
	37	28.570	35.484	55.678	51.853
	28	29.761	39.920	55.982	52.084
Average		28.492	38.992	56.277	50.999
Post-seeding stage	70	21.047	35.720	52.082	48.172
	35	22.352	31.492	49.409	35.639
	33	21.718	40.110	57.953	56.406
	176	24.527	35.124	49.763	43.102
Average		22.411	35.589	52.289	45.830

The digestibility coefficients for all the organic constituents were found to be higher in the hay at the flowering stage than those recorded for the hay at the post-seeding stage. The digestibility coefficients, especially of crude protein and ether extract are of a low order for both the samples of *anjan* hay, whereas, those of crude fibre and nitrogen-free extract may be considered satisfactory.

The percentage digestible crude protein and total digestible nutrients of the two samples of *anjan* hay from Rajasthan are expressed in Table IV and compared with the values of *anjan* hay from U.P., Punjab and Madras (Sen, *loc. cit.*)

TABLE IV

Feeding stuff.	Digestible nutrients in kg. per 100 kg. of dry material				Nutritive Ratio
	Crude Protein	Ether Ext.	Carbo-hydrates	Total	
<i>Anjan</i> hay from Rajasthan :—					
(i) Flowering stage	1.57	0.32	40.64	42.93	1 : 26.34
(ii) Post-seeding stage.	1.03	0.28	39.52	41.18	1 : 38.98
<i>Anjan</i> hay (Meerut, U.P.)	1.71	0.25	49.41	51.68	1 : 29.30
<i>Anjan</i> hay (Punjab)	2.01	0.43	47.54	50.51	1 : 24.20
<i>Anjan</i> hay (Hosur, Madras):—					
(i) Young stage	11.17	0.32	47.56	59.44	1 : 4.30
(ii) Prime stage	5.49	0.48	49.56	56.13	1 : 9.20
(iii) Ripe stage	2.97	0.16	49.46	52.78	1 : 16.80

The data expressed in table IV indicate that the values of digestible crude protein and total digestible nutrients in the flowering and post-seeding stages of *anjan* hay from Rajasthan are lower than those of *anjan* hays from the other parts of this country. The nutritive ratio in the test samples of *anjan* hay is fairly wide which shows that the proportion of digestible protein to that of non-nitrogenous nutrients is much less. Such feeds, therefore, are unsuitable for growing animals where the object is to produce best rate of gain of live weight. In general, rations having a narrower nutritive ratio than 1 : 5 are considered suitable to ensure optimum growth rate in the calves. The hays in the flowering and post-seeding stages from Rajasthan are rather poor in digestible protein as neither of them could maintain the adult *kumaoni* bullocks in nitrogen equilibrium. Instead the experimental bullocks recorded negative balances for nitrogen (Table V) and loss in body weight (Table II).

The nitrogen, calcium and phosphorus balances displayed by the experimental bullocks fed *anjan* hay from Rajasthan in the flowering and post-seeding stages are given in Table V.

TABLE V

Nitrogen, Calcium and phosphorus balances in gm. per day.

Nitrogen, Calcium and phosphorus balances in hay								
Stage	Bullock No.	Offered in hay	Left in residue.	Consumed from hay	Excretion			Balance
					Faeces	Urine	Total	
Nitrogen Balance								
Flowering stage	182	34.38	4.41	29.97	20.80	10.00	30.80	— 0.83
	75	34.38	2.80	31.58	22.00	10.48	32.48	— 0.90
	37	34.38	1.89	32.49	22.40	11.04	33.44	— 0.95
	28	34.38	3.07	31.31	21.00	10.72	31.92	— 0.61
Average		34.38	3.04	31.34	21.60	10.56	32.16	— 0.82
Post-seeding stage	70	27.21	3.79	23.42	18.50	8.80	27.30	— 3.88
	35	27.21	3.01	24.20	18.80	9.32	28.12	— 3.92
	33	27.21	2.18	25.03	19.60	9.64	29.24	— 4.21
	176	27.21	2.31	24.90	18.80	10.12	28.92	— 4.02
Average		27.21	2.82	24.39	18.93	9.47	28.40	— 4.01
Calcium Balance								
Flowering stage	182	16.12	3.00	13.12	11.19	0.73	11.92	+ 1.20
	75	16.12	1.91	14.21	12.50	0.73	13.23	+ 0.98
	37	16.12	1.29	14.83	13.04	0.84	13.88	+ 0.95
	28	16.12	2.09	14.03	12.51	0.57	13.08	+ 0.95
Average		16.12	2.07	14.05	12.31	0.72	13.03	+ 1.02
Post-seeding stage	70	12.75	2.54	10.21	12.78	1.25	14.03	— 3.82
	35	12.75	2.01	10.74	13.46	1.07	14.53	— 3.79
	83	12.75	1.46	11.29	12.40	1.71	14.11	— 2.82
	176	12.75	1.55	11.20	12.40	1.78	14.18	— 2.98
Average		12.75	1.89	10.86	12.76	1.45	14.21	— 3.85
Phosphorus Balance								
Flowering stage	182	7.91	1.54	6.37	4.92	0.03	4.95	+ 1.42
	75	7.91	0.98	6.93	5.13	0.01	5.14	+ 1.79
	37	7.91	0.66	7.25	5.45	0.03	5.48	+ 1.77
	28	7.91	1.07	6.84	5.38	0.04	5.42	+ 1.42
Average		7.91	1.06	6.85	5.22	0.03	5.25	+ 1.60
Post-seeding stage	70	5.93	1.02	4.91	4.00	0.02	4.02	+ 0.89
	35	5.93	0.81	5.12	4.62	0.04	4.66	+ 0.46
	33	5.93	0.59	5.34	4.07	0.05	4.12	+ 1.22
	176	5.93	0.62	5.31	4.39	0.04	4.43	+ 0.88
Average		5.93	0.76	5.17	4.27	0.04	4.31	+ 0.86

Table V reveals that the experimental animals in both the feeding trials remained in negative nitrogen balance although it was more marked in the case of animals fed *anjan* hay of the post-seeding stage. The calcium balances were negative for animals fed the post-seeding

stage hay and positive for those fed the flowering stage hay. The phosphorous balances were positive in both the feeding trials.

It may be concluded from the above observations that *anjan* hay from Rajasthan forests in the flowering and post-seeding stages cannot meet the maintenance requirements of cattle grazing on them without supplements of protein rich concentrates. In order to utilize the grass profitably so that it supplies higher nutrients to grazing animals, it must be harvested or grazed at much earlier stages than those of the two samples reported here.

Summary

The nutritive value of *anjan* hay from Rajasthan forest at the flowering and post-seeding stages has been determined.

The hay samples were fed *ad lib* to *kumaoni* bullocks for 32 days and metabolism trials conducted during the last 10 days.

The digestibility coefficients for crude protein, ether extract, crude fibre and nitrogen-free extract were found to be 28.49, 38.99, 56.28 and 51.00 respectively for the flowering stage hay, and in the same order 22.41, 35.59, 52.29 and 45.83 respectively for the post-seeding stage hay. The percentage digestible crude protein and total digestible nutrients on dry basis, were 1.57 and 42.93 for the hay in the flowering stage and 1.03 and 43.17 for the hay in the post-seeding stage respectively. With *anjan* hay of the flowering stage the nitrogen balance was negative but the calcium and phosphorus balances were positive, whereas with *anjan* hay of the post-seeding stage, the balances for nitrogen and phosphorus were negative, although the calcium balance was positive.

Acknowledgments

The authors express their thanks to Shri N. N. Sen, Chief Conservator of Forests, Rajasthan who kindly arranged supplies of *anjan* hay from grazing areas of Rajasthan forests.

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A PRELIMINARY NOTE ON THE PREVALENCE AND PATHOGENICITY OF HAEMOLYTIC ESCHERICHIA COLI IN SHEEP AND GOATS IN ANDHRA PRADESH

BY

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Introduction

Haemolytic *E.coli* plays an important role as an etiological factor for various disease conditions in man and animals. Topley and Wilson (1955) state that *E.coli* is responsible for acute enteritis in children and calves as also for numerous cases of suppurative conditions of gall bladder and urinary tract. Gaiger and Davies (1955) are of opinion that *E.coli* is associated with disease conditions like "white scour" in calves, 'Joint ill' to some extent in young stock and cystitis and urethritis among sheep. This organism is also responsible for deaths in week old chicks. In young pigs *E.coli* is found to be responsible for scours according to Jackson (1952) and for "Oedema Disease" (Gitter and Lloyd, 1957).

From a perusal of available literature it is found that information regarding the pathogenicity of haemolytic *E.coli* in sheep is scanty. During the course of routine investigation work, the author has encountered heavy mortality in lambs of various age groups in which haemorrhagic gastro-enteritis in some and pneumonia in others and in a few cases both, were the prominent lesions. Cultural examinations of relevant materials were conducted and haemolytic *E.coli* could be isolated either in a pure or nearly pure culture. The cultural and biochemical characters of the isolated strains were studied and their pathogenicity to laboratory animals was tested. Both young and old animals were susceptible to the infection. In young lambs, the death was very sudden and in the older ones, the course of the disease was prolonged. Both sexes were equally susceptible and there was no difference in the rate of mortality among them. The disease had a sudden onset in lambs associated with rise of temperature within a few hours and diarrhoea on the second day. In very young lambs, death was common before any symptoms were noticed. The important organs that were involved were the gastro-intestinal tract and the lungs. The abomasum revealed patches of congestion and inflammation, both at the fundus and pyloric portions. The small intestines revealed similar areas of congestion and inflammation commencing from the pyloric end and extending upto the Ileocaecal valve. No apparent

ulceration could however be detected (negative for lamb dysentery) throughout the length of the affected area. The mesentery revealed engorgement of the veins and their lymph nodes were found to be slightly enlarged. The lungs revealed patches of congestion and consolidation together with adhesions with the pleura. In acute cases, consolidation was rarely seen but in prolonged cases it was rather a constant finding. The myo-cardium revealed patches of congestion.

Materials and Methods

Materials in the form of swabs from heart blood and viscera like spleen, liver and pneumonic lung were collected for cultural examination from dead sheep and goats immediately after death. These were sown in broth and on blood agar plates and incubated. Haemolytic strains were isolated and their staining, cultural and bio-chemical reactions were studied. In a few cases the ailing animals were sacrificed in their extremis and materials were collected for cultural examination.

Results and Discussion

Cultures of Heart blood from nine cases, six of lung, four of spleen and one each from liver and kidney were made and in all haemolytic *E.coli* was isolated. In addition, smears from a few cases of heart blood, lung, liver and spleen were examined and organisms morphologically indistinguishable from *E.coli* were demonstrated. The organisms are gram negative 1-3 μ in length, having parallel sides and rounded ends. On gram's staining the ends are more deeply stained with aniline dyes and are non-sporulating and non-capsulated. All the strains are found to be actively motile. Abundant turbid growth is observed on 24 hours incubation in nutrient broth. A mucoid ring at the top of the media is a characteristic finding. Small circular raised translucent colonies with entire edges are observed on agar plates. In blood agar plates, growth is profuse after 24 hours. The colonies are opaque and are surrounded by a wide zone of beta-haemolysis which persisted even after many sub-cultures. The Bio-chemical Characters of haemolytic *E.coli* isolated from different cases are presented in the following table:

Efforts were made to study the pathogenicity in some cases in laboratory animals. Eighteen hour-old active broth culture was inoculated in 0.25 c.c. and 0.5 c.c. doses S/C into swiss mice and rabbits respectively. The mice in several cases died in 16 hours and *E.coli* was detected in heart blood, liver, and spleen smears. On post-mortem examination the internal organs were found congested and spleen slightly enlarged. The rabbits revealed a rise in temperature 105°F — 106°F within 24 hours but survived with abscess formation at the site of injection. But the organism does not produce any exotoxin.

Sl. No.	Specimen No.	Lac-tose	Suc-rose	Dext-rose	Mal-tose	Xy-lose	Mann-itol	Dul-citol	Sal-i-cin	M. R.	V. P.	Indol	H ₂ S	Citr-ate	A. G. is Acid & Gas.
1	940	A.G.	A.G.	A.G.	A.G.	A.G.	A.G.	N	N	+	N	+	N	N	N. is Negative.
2	867	A.G.	A.G.	A.G.	A.G.	A.G.	A.G.	N	N	+	N	+	N	N	+
3	837	A.G.	A.G.	A.G.	A.G.	A.G.	A.G.	N	N	+	N	+	N	N	+
4	884	A.G.	A.G.	A.G.	A.G.	A.G.	A.G.	N	N	+	N	+	N	N	+

Incubated for 16 days at 37°C. and studied late reactions also.

Sero-Types: The following are the serotypes of strains isolated from four (4) cases and typed by the International Salmonella and Escherichia Centre, Copenhagen — Denmark.

Sl. No.	Specimen No. and kind of animal	Sero-Type isolated
1.	940 (Ram)	<i>E. coli</i> strain has a weak O-Antigen relationship to O-36 and O-88 and has H. Antigen-16.
2.	867 (Lamb)	<i>E. coli</i> has O-Antigen 88 and H. Antigen-7.
3.	884 (Ewe)	<i>E. coli</i> has O-Antigen 108 and H. Antigen-11.
4.	887 (Buck)	<i>E. coli</i> has O-Antigen 6 and H. Antigen-11.

During the routine investigation work with the diseases in sheep, the author has encountered cases of pneumonia and gastro-enteritis. The cultural examination of organs and swabs from heart blood in some cases revealed haemolytic *E. coli*. It is to be ascertained as to how far *E. coli* is responsible for the mortality in young lambs and adults. The preliminary experiments suggest that certain strains of haemolytic *E. coli* isolated from these cases are at least pathogenic to laboratory animals producing a septicæmic affection. Such haemolytic *E. coli* organisms may in all probability be the causative agent in certain cases of mortality due to pneumonia and gastro-enteritis particularly in young lambs. Further work with regard to isolation and typing of some more strains from field cases and their pathogenicity to lambs and sheep is under study.

Summary

1. A few strains of Haemolytic *E. coli* were isolated from cases of pneumonia and gastro-enteritis in lambs.
2. Pathogenicity experiments to laboratory animals were conducted and their pathogenicity is found to be variable, different strains acting differently.
3. All the strains looked identical morphologically, culturally, and Bio-Chemically but proved to be different on serological typing.

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QUANTITATIVE BIOCHEMICAL STUDIES ON CAMEL'S BLOOD Part II—Inorganic Phosphorus and Sodium content

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Introduction

In the first part of this series (6) the findings on the sugar and chloride content of camel's Blood were reported. This part deals with the normal values of inorganic phosphorus and sodium.

Review of Literature

Except for the solitary work of Gnest and Rapoport (1941) quoted by Albritton (1952) giving the average blood inorganic phosphorus level of the camel as 5.6 mg/100 cc., no reference of the normal inorganic phosphorus and sodium content of the camel's blood was traceable in the veterinary literature available to the authors (4, 1).

Materials and Methods

Thirty healthy adult male Indian one humped camels (*Camelus dromedarius*) were selected for this study. The blood was collected from the jugular vein in heparinized tubes for the separation of plasma. The samples were subjected to the quantitative determination of inorganic phosphorus content by the method of Fiske and Subbarow (1925) and sodium content by the method of Weinback (1935) as described by Hawk *et al* (1954).

Results

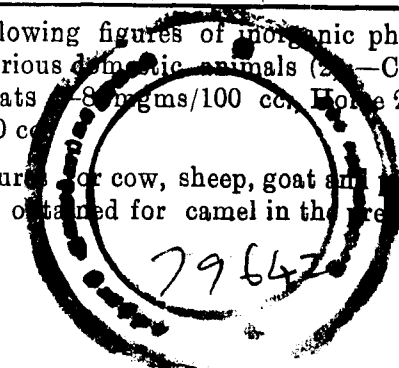
The results obtained are reported in the table below :

Sl. No.	Constituents	Values of inorganic phosphorus and sodium in Mgs/100 cc. of plasma				
		Minimum	Maximum	Average	Standard deviation	90% Range
1.	Inorganic phosphorus	5.45	8.80	7.18	± 0.9	6.28 to 8.08
	Sodium	304.7	333.5	321.9	± 11.4	316.1 to 344.9

Dukes (1955) has given the following figures of inorganic phosphorus content of the serum of various domestic animals (2) — Cow 3-8 mgms/100 cc., Sheep and Goats 2-8 mgms/100 cc., Horse 2-5 mgms/100 cc. and Dog 2-4 mgms/100 cc.

As compared to the normal figures for cow, sheep, goat and pigs, the range of variation in the values obtained for camel in the present

KZ m2, n24
N62.39.4



investigation is less, showing thereby the better possibility of laying down a standard "Normal" for this species.

The normal values for horses and dogs are much lower than those found out for camel. The average figure of 5.6 mgms/100 cc. reported for camel by Guest and Rapoport (1941) is significantly lower than the average value found in the present investigation. The sodium content of human blood plasma is 300 to 330 mgms (5) which closely approximates the average value obtained for camel. In the absence of previous work on the sodium content of camel's blood in the available literature the authors are unable to compare the present findings with similar data.

Summary

Thirty samples of camel's blood plasma were analysed for inorganic phosphorus and sodium content and average findings recorded were 7.18 mgms/100 cc. and 321.9 mgms/100 cc. respectively.

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ANALYSIS OF MILK IN INDIGENOUS COWS OF ORISSA AND THE EFFECTS OF STAGE AND NUMBER OF LACTATION ON ITS COMPOSITION

By

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Introduction

According to Imp. Cattle Breeding Farm (1934) Karnal, 40 milk samples belonging to Haryana breed on analysis revealed: Specific Gravity, 1.031; Fat percent 4.60; and Solids not fat (S.N.F.) percent 9.68 and 50 milk samples of Tharparkar breed gave: Specific Gravity, 1.031; Fat percent, 4.60; and S.N.F. %, 9.63. As per Imp. Dairy Inst. (1940) Bangalore, an analysis of 2500 milk samples of Red Sindhi breed gave 4.65% fat. Similarly Military Dairy (1916) Peshawar analysed 134 Sahiwal milk samples which showed: Specific Gravity, 1.032; Fat percent, 4.65; and S.N.F. % 9.20. Apart from these findings, various authors have reported on the average lactose, protein and ash percentages of milk from different breeds. Sen and Dastur (1947) analysed 57 Red Sindhi composite herd samples and found the lactose percent to be 5.06. Stewart and Banerjee (1930-31) reported the average lactose content of 64 samples of cow milk to be 4.45%. Brahmachari (1934) analysed 86 samples of cow milk and found the average lactose and ash contents to be 3.5% and 0.74% respectively. Seshan (1937) reports the average protein content of cow milk to be 3.02. Bunce (1932) found the average ash content of cow milk to be 0.75% whereas Raysarkar (1943) reports the same for Haryana breed as 0.77%. With regard to acidity of milk, Caulifield and Riddell (1936) reported the average acidity of milk from Ayrshire as 0.160%; Holstein, 0.161%; Guernsey, 0.172%; and Jersey, 0.179%. No records of acidity for Indian pure breeds of cows are available to the best knowledge of the authors.

With regard to the effect of stage of lactation on the composition of milk Ragsdale & Turner (1922) reported "The fat content of milk declines during the first 2 or 3 months of lactation. Following this, there is a gradual increase, becoming more pronounced near the end of lactation." Sommer (1952) reports "The S.N.F. content is high in colostrum, declining during first month to a point which is maintained

fairly uniformly during the greater part of lactation. About two months before the close of lactation the S.N.F. content starts to increase," gradually at first and then quite sharply towards the very close. Trunz (1903) reported that the ash content of milk remains constant in amount upto within the last 2 or 3 months of lactation and during final months of lactation there is a definite increase in total ash.

In respect of the effect of number of lactations on composition of milk Bartlett (1934) found in cows a gradual, uniform decrease in S. N. F. content with each successive lactation. But Ragale *et al* (1958) found in buffaloes that animals having 4 or more lactations gave higher averages for butter fat and Total Solids contents followed by 2nd calvers. In case of protein and S.N.F. the highest averages were obtained by 2nd calvers followed by older animals. Buffaloes calving for the first time gave lowest value for all milk constituents.

In India the maximum amount of milk supply is from the indigenous cows of the rural areas compared to that of the pure breeds of cows belonging to Red Sindhi, Hariana and such other breeds. From the literature cited above it may be seen that rare records are available regarding the milk analysis and the effects of stage and number of lactation on its composition in the indigenous and nondescriptive cattle in India. In view of this, the authors have attempted in this paper to assess the above factors for the indigenous cows of Orissa.

Materials and Methods

Milk samples were collected from 35 indigenous cows of Bubha-neswar town, Orissa. Collection of the milk samples was done on the spot by the authors themselves or by reliable laboratory workers from cows, while being milked to avoid the possibilities of adulteration. Therefore all the 35 samples were genuine milk. While collecting milk from a cow her number and stage of lactation were also recorded. The age of the cows could not be ascertained as they were indigenous cows without any authentic record. Out of the 35 cows only one was pregnant. So the effects of age and pregnancy on the composition of milk of these cows could not be ascertained. Within one to two hours of collection of milk samples, they were subjected to laboratory test such as acidity, specific gravity, fat, total solids (T.S.), Solids not fat (S.N.F.), Protein, lactose, and ash percentages. The acidity was conducted by volumetric method; specific gravity, by thermolactometer, fat percent by Gerber's method; T.S. by gravimetric method; S.N.F. by deducting fat from T. S.; Protein by aldehyde method (Ling 1956); ash by gravimetric method (Aggarwala 1953); and lactose by deducting the sum of fat, protein and ash percentages from T. S. %.

Results

As may be seen from table I, the specific gravity, acidity and lactose percent are practically the same during both the rising and declining phases of lactation. But the rise in fat% during declining phase is 38.4% over the rising phase and the same for T.S. is 13.3%; S.N.F., 2.8%; Protein, 4.8% and ash, 5.9%.

TABLE I
Averages of milk constituents, specific gravity, and acidity.

No. of individual samples examined	Phase of lactation	Average specific gravity	Average percentages of						
			Acidity	Fat	T. S.	S. N. F.	Lactose	Protein	Ash
14	Rising phase (upto 3 months)	1.0318	0.172	3.90	13.16	9.27	5.363	3.27	0.64
21	Declining phase (beyond 3 months)	1.0313	0.169	5.40	14.92	9.53	5.421	3.43	0.678
35	Entire lactation	1.0315	0.170	4.65	14.04	9.40	5.392	3.35	0.659

The results indicate that the fat, T.S., S.N.F., protein, and ash contents are low in early lactation and they increase during late lactation. The Table I also shows the averages of 35 individual milk samples in specific gravity, acidity, Fat, T.S., S.N.F., lactose and ash contents to be 1.0315, 0.170%, 4.65%, 14.04%, 9.40%, 5.392%, 3.35% and 0.659% respectively.

The 35 cows used in this experiment were grouped according to the stage of their lactations monthwise and the averages of the ash, protein, fat, lactose, S.N.F. and T.S. percentages of milk from each of these groups were calculated and these are tabulated in table II. Graph I was plotted with lactation in months against average percentages of the above milk constituents. Similarly all the cows were grouped as per their number of lactations and the averages of the above milk constituents for each group of animals were calculated and they are tabulated in table III. Graph No. 2 was similarly plotted with the number of lactations against the average percentages of milk constituents.

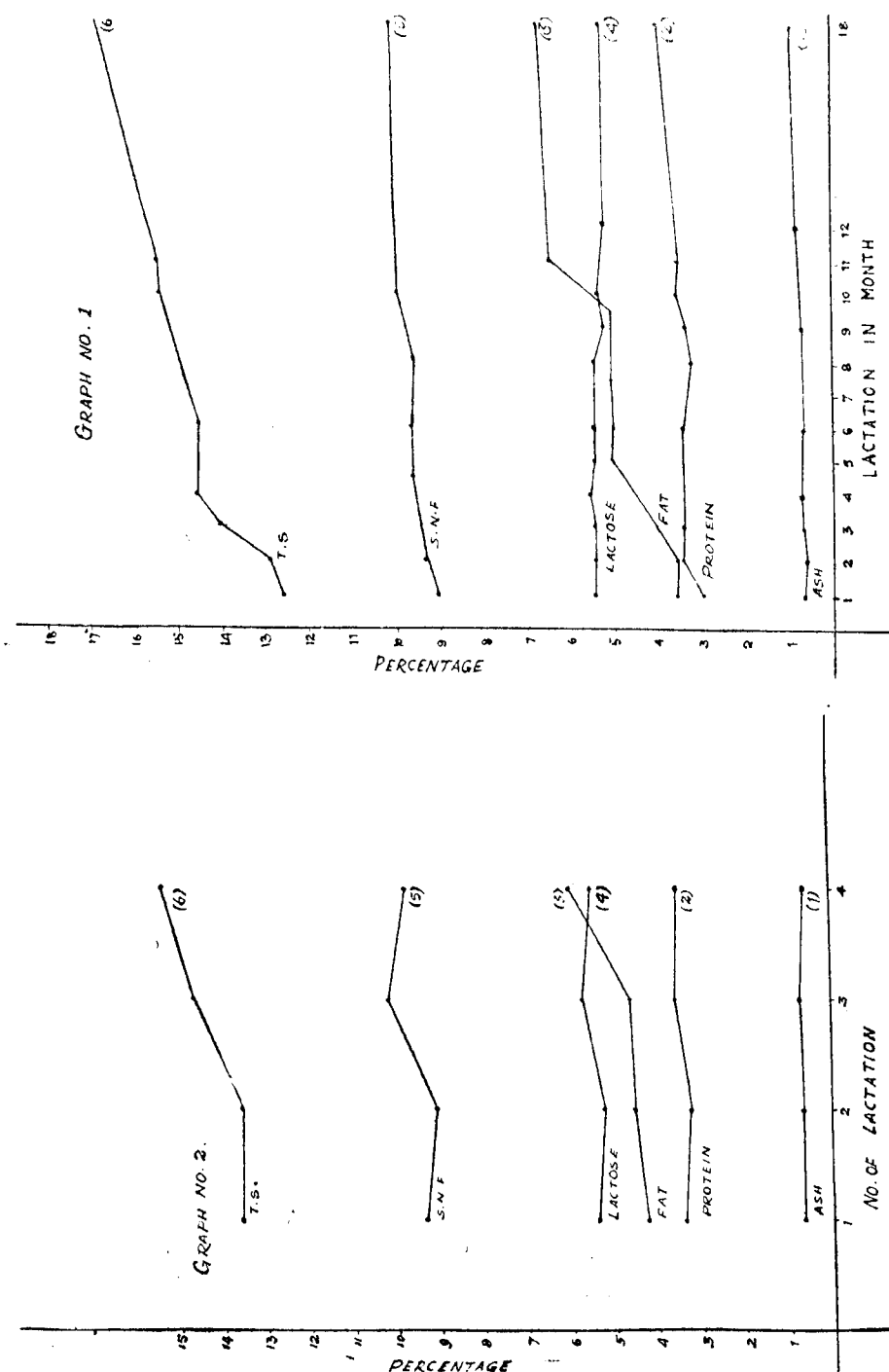


TABLE II
Composition of milk at different stages of lactations.

Particulars	Lactation in months														
	1	2	3	4	4½	5	6	7½	8	9	9½	10	11	12	18
Ash%	0.65	0.59	0.7	0.71	—	—	0.68	—	—	0.71	—	—	—	0.79	0.85
Protein%	2.93	3.43	3.37	—	—	—	3.37	—	3.22	3.34	—	3.57	3.50	—	3.99
Fat%	3.65	3.57	4.00	—	—	5.10	5.00	5.07	—	—	5.17	—	6.45	—	6.75
Lactose%	5.43	5.29	5.38	5.54	—	5.30	5.33	—	5.43	5.24	—	5.37	—	5.17	5.28
S.N.F.%	9.02	9.32	9.46	—	9.36	—	9.56	—	9.55	—	—	9.96	—	—	10.18
T.S.%	12.67	12.88	14.06	14.62	—	14.61	14.92	—	—	—	—	15.46	15.74	—	16.88

TABLE III
Composition of milk at different number of lactations.

Particulars	Number of lactation			
	1	2	3	4
Ash%	0.668	0.644	0.724	0.623
Protein%	3.32	3.16	3.58	3.50
Fat%	4.20	4.50	4.60	5.90
Lactose%	5.344	5.180	5.717	5.421
S.N.F.%	9.33	8.99	10.02	9.54
T.S.%	13.57	13.50	14.63	15.47

From Table II and Graph 1 it can be seen that the ash content remains more or less constant till 9th month of lactation and beyond it in 12th and 18th months its increase is pronounced. The protein content is lowest in 1st month and after this its level is more or less maintained until 11th month and during 18th month it shows a pronounced rise. The fat content is high in the 1st month, showing a decline in 2nd month, after which there is a gradual rise till 9½ months beyond which the rise becomes quite sharp. The lactose content remains more or less the same throughout the lactation period. The S.N.F. content is lowest in 1st month, after which its level is more or less maintained till the 9th month and at 10th month and beyond it the rise is more pronounced. The T.S. content is lowest in the 1st month after which it shows a rising trend until 6th month beyond which the rise is more pronounced.

Table III and Graph II depict the effects of number of lactation on the composition of milk. All cows taken in this experiment were within their 4th lactation. So the effects of the number of lactation beyond 4th lactation on the composition of milk could not be studied. It can be seen from the above table and graph that the fat content shows a gradual rising trend from 1st till 4th lactation. Similar is the case with T.S. content. The S.N.F. content is more or less the same during both 1st and 2nd lactation, showing a rise in 3rd and a decline in 4th lactation. Similar is the case with lactose, protein and ash contents.

Summary

1. 35 milk samples from the individual indigenous cows of Orissa have been analysed.
2. The averages for different milk constituents as well as specific gravity and acidity for the above cows have been assessed.
3. The effects of stage and number of lactation on the composition of such milk have been ascertained.

Acknowledgment

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HAEMATOLOGICAL SEX DETERMINATION IN DOGS

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Introduction

Studies made on the Haematology of dogs revealed certain unique diagnostic features that are helpful to identify the sex of the animal when its blood smear is given. A survey of literature revealed little information on the above topic especially in the animals. The available literature showed that the technique of Haematological Sex determination in human beings was worked by Davidson and Smith in the year 1954 who first reported on the specific differences in the neutrophils which ultimately determine the sex of the animal.

The most suitable test for the purpose appeared at first to be Skin biopsy introduced by Moore-*et-al* (1953) but the above method necessitated an operation. So investigations were carried out for simpler methods in human beings and they were

1. Estimation of cell nuclei in Epithelial scrapings of oral mucosa and
2. Differentiation of nuclear appendages in the Neutrophils in the blood films.

The present work is a successful attempt to find out the suitability of the above second test *i.e.* Haematological diagnostic test in dogs.

Materials and Methods

Blood films of good quality *i.e.* neither thick nor thin were taken from apparently healthy 30 adult dogs. No particular breed was selected. Most of the dogs in the present study were only mongrels. From each individual two to three blood smears were taken from the ear vein and stained with Giemsa and Leishman stains. A selection was made of this smear in which more neutrophil Leucocytes were found. The available literature showed that the blood smears could be stained by Toluidine blue or May-Grunwald Giemsa technique but even the Giemsa Leishman technique was found suitable by the authors.

In each and every blood film only the neutrophils were examined for their typical segmentation and structure of nuclei. The neutrophils showed the following four types of Nuclear appendages:—

Type (1) Drumstick or hanging drop form. The most distinctive nuclear appendage for sex diagnosis is the drumstick or the hanging drop (fig. 1, A). This was mostly seen as a nodule of homogeneous structure adequately stained and connected to a nuclear segment by a single thin strand of chromatine — suggestive of its name. The drumstick was usually only one in the cell, but the thin strand of chromatine which connected the two lobes varied in its length.

Type (ii) Sessile Nodules and Tags:—Another configuration resembling the drumstick, and of equal diagnostic significance is the sessile nodule. The only difference was the absence of chromatine strand between the two lobes, the appendages being directly attached to a nuclear segment either on a broad base (sessile nodule Fig. 1, B) or by its tip (sessile Tag Fig 1, C).

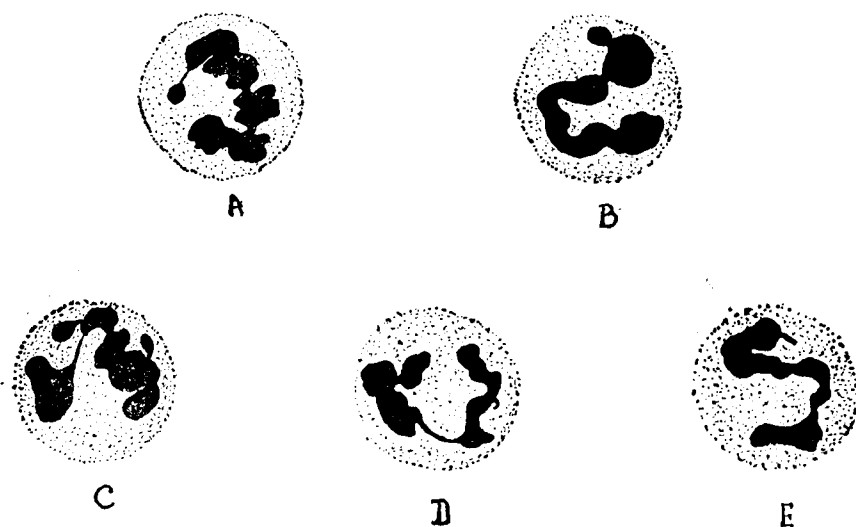


Fig. 1 Diagramatic.

Both the types of Nuclear appendage were highly characteristic but strikingly different from each other due to the thin chromatine strand which connected the lobes.

Type (iii) Hooks: Another configuration strikingly different from the drumstick and sessile nodule, was the presence of hook. One of the nuclear appendages sharply turned in or turned out in the form of a hook. Hook was always found to be the only one in the cell and demanded careful investigation for its identification (Fig. 1, D).

Type (iv) Rods: The other configuration distinct from the hook was the presence of rod. The nuclear appendage instead of sharply taking a turn as in the case of Hook, remained straight with usually

a fixed length but it was never like a thin strand of chromatine (Fig. 1, E).

Results

(1) Type (i) *i.e.* drumstick or hanging drop like forms were mostly seen in the female animals; even though they have also been recorded in the males but to a lesser extent.

(2) Sessile nodules were found both in the Males and Females but mostly in the females.

(3) Hooks were distinctively diagnostic of males. They were rarely seen in females.

(4) Rods were only seen in the Males and very rare in females.

On an average in every 500 Polymorphonuclear leucocytes in the males there were 5 drumsticks, 3.3 sessile nodules, 9.2 Hooks and 3 Rods were recorded (Ref. Table). And in the females the average number of drumsticks and sessile nodules for every 500 neutrophils were 12.5 and 11.5 respectively. The number of Hooks and Rods were negligible.

Discussion

(1) The count of the above said four types of Nuclear appendages was made in 500 Neutrophils.

(2) Better results were always recorded when 500 neutrophils were counted from every animal instead of 100 neutrophils.

(3) Drumstick could easily be noticed but Hooks and Rods needed careful investigations.

(4) In five cases out of 30, the figures did not correspond to the expected results *eg.* S. No. 6, 9, 14, 18 and 28.

(5) The above results which were quite encouraging and have shown that the sex determination can also be made by means of blood smears.

(6) The present study was only confined to dogs as the percentage of neutrophils is more when compared to that of the other species.

(7) It is evident from the above results that the sex determination can be made on the basis of the presence or absence of the particular nuclear appendages in neutrophils by an examination of the blood films.

The authors have successfully identified the sex of the animal (dogs) when their blood smears have been provided with,

Table showing the Four Types of Nuclear Appendages
The count under each item was made in a total of 500 Neutrophils.

Sl. No.	Sex	Drumsticks	Sessile Nodules and Tags	Hooks	Rods	Ratio
1	2	3	4	5	6	7
1.	Male	4	2	10	3	6 : 13
2.	"	4	4	11	4	8 : 15
3.	"	3	1	8	2	4 : 10
4.	"	3	6	12	4	9 : 16
5.	"	5	—	9	3	5 : 12
6.	"	6	6	6	4	12 : 10
7.	"	3	3	6	5	6 : 11
8.	"	3	6	9	2	9 : 11
9.	"	7	7	8	3	14 : 11
10.	"	6	2	12	4	8 : 16
11.	"	6	3	9	3	9 : 12
12.	"	5	1	9	2	6 : 11
13.	"	8	—	10	3	8 : 13
14.	"	8	6	11	1	14 : 12
Average		5.0	3.3	9.2	3.0	8.3 : 12.2
15.	Female	12	10	1	—	22 : 1
16.	"	11	13	2	1	24 : 3
17.	"	12	10	—	1	22 : 1
18.	"	8	5	12	3	13 : 15
19.	"	15	10	2	—	25 : 2
20.	"	14	12	1	—	26 : 1
21.	"	12	13	2	—	25 : 2
22.	"	13	14	1	—	27 : 1
23.	"	15	10	1	1	25 : 2
24.	"	12	14	2	—	26 : 2
25.	"	13	15	1	—	28 : 1
26.	"	16	12	—	1	28 : 1
27.	"	14	14	—	2	28 : 2
28.	"	8	3	8	4	11 : 12
29.	"	12	14	1	—	26 : 1
30.	"	13	15	—	1	28 : 1
Average		12.5	11.5	2.1	0.8	24 : 2.9

Summary

A study of 30 blood films from the adult healthy dogs was made for haematological sex determination. The blood smears were stained with Giemsa and Leishman stains. Four types of neutrophils were recorded. Drumsticks, sessile nodules and tags were characteristic of females whereas Hooks and Rods were predominant in males. In the present study only 17% of the cases have not corresponded to the expected results.

The present study revealed that the Haematological sex determination can also be employed in dogs successfully as a valuable diagnostic measure.

Further work is under progress :

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THE TOXIC EFFECTS OF DDT, DMDT, gamma-BHC AND CO-RAL AGAINST THE VARIOUS STAGES OF THE STABLE FLY

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Introduction

The importance of insecticides in modern age is very great and their use in the field of Veterinary Medicine is steadily advancing. Their reduced cost, high effectiveness and more specific action have given a few of them leading positions in the control of insects. Dichlorodiphenyltrichloroethane commonly called DDT, methoxychlor commonly called DMDT and lindane also called gamma-BHC are among these. Recent trends have been to use insecticides which cause a rapid control of insects and offer minimum hazards to man and animals. Such a product is Bayer 21/199, commonly known as CO-RAL. It is a powerful systemic insecticide, yet not particularly hazardous to mammals. This paper presents the results of a series of tests in which DDT, DMDT, gamma-BHC and CO-RAL suspensions were used in the laboratory against the various stages of the stable fly *Stomoxys calcitrans* (L).

Review of Literature

DDT was first used in controlling stable flies in 1943 by Blakeslee (1944). In 1944, Blakeslee also found that surface sprays of bay water emulsions of both the technical DDT and residual DDT can be effectively used for controlling stable fly breeding in deposits of marine grass. Bruce and Blakeslee (1946) observed the effectiveness of DDT against several species of insects affecting livestock in South-eastern United States and stated that a 2 percent DDT emulsion spray was very effective in controlling a serious out-break of *Stomoxys calcitrans* (L) in Central Florida.

Knipling and Mc Duffie (1957) described methoxychlor to be very effective against biting flies of cattle (Stable flies and horn flies), when applied in the form of sprays.

Smith & Richard (1954) first reported the high effectiveness of CO-RAL in the control of cattle grubs which was confirmed by Roth and Eddy (1955). Subsequent experiments conducted at Kerville, Texas in 1955-56 established that CO-RAL destroys young grubs in the body of the host before they break through the skin.

Testing the insecticides against the adult flies

The D.D.T. used in this experiment was a 50 percent wettable powder. A pilot test was first run to determine the best way of conducting the experiments.

The test-insects consisted of 240 four day-old stable flies reared in the laboratory and kept ready for spraying operations. The flies were anaesthetised with carbondioxide and 20 of them randomly chosen were placed in each of the twelve 9 cm petri-dishes having a filter paper.

The Devilbiss spray was calibrated using the check contraction and it was found that the nozzle delivered a 4 ml. of spray in 5 seconds at a pressure of 10 lbs. per square inch.

At the time of spraying, the petri-dishes containing the anaesthetised flies were placed in the spray booth and the flies were sprayed from a distance of twenty inches with the check spray first and then with the ascending concentrations of DDT. The volume of spray (4 ml.) and the exposure time (5 seconds) remained constant throughout the test. The flies were then transferred to a holding glass jar and the glass covered by cheese cloth. A cotton roll soaked in 3 percent sugar solution was kept in the holding jar to provide moisture and food for the flies. Two replicates of each test were run in this way. A check of untreated flies was also kept as control. The percent mortality was recorded after 24 hours and it was observed that a 0.025 percent concentration caused 15 percent mortality and the 0.3 percent caused 90 percent kill.

Based on these results the final test concentrations were formulated. The various concentrations used were 0.025, 0.05, 0.1, 0.2, 0.3 and 0.4 percent. Three experiments were performed on alternate days, percent mortality observed after 24 hours and the average taken.

Similar tests were conducted with methoxychlor, lindane and CO-RAL. The methoxychlor used was 50 percent wettable powder and the lindane was a 25 percent wettable powder. The CO-RAL was also a 25 percent wettable powder.

Tests against the eggs, larvae & pupae

Eggs: Freshly collected eggs were used. Fifty eggs were counted and transferred to a filter paper in a petri-dish with sufficient water added to keep the filter paper moist for two days. Spraying was done from a distance of twenty inches, the volume of spray and the exposure time being the same as used for the adults. Viability of eggs was noted after 48 hours by counting the number of larvae which emerged from the treated eggs. Two replicates of each concentration were run, three such experiments conducted on alternate days and the average of the results taken.

Larvae & Pupae: The various insecticides were similarly tested against the larvae and the pupae. In testing against the larvae, the third instar larvae were used and a number of 20 was arbitrarily chosen for performing the tests. For the pupae, fifty of them were used and the effects of different concentrations of various insecticides were recorded by counting the number of flies which emerged from the treated pupae after five days and the average of the results taken.

Results

Toxic effects of DDT, DMDT, gamma-BHC and CO-RAL were noted against various stages of the stable fly and the results recorded. The mortality of adult stable flies at various levels of concentration were averaged and plotted on probit-log paper (fig-1). Regression lines for all the four toxicants were drawn on the same log paper in order to simplify comparison of their relative toxicities, and the dosage corresponding to 50 percent mortality (LD_{50}) read from these lines. Comparing M.L.D. (median lethal dose), CO-RAL was 5.2 times as toxic as gamma-BHC, 31.2 times as toxic as DMDT and 44 times as toxic as DDT.

Lindane was the most toxic material to adult stable flies among the chlorinated hydrocarbons and its LD_{50} was lowest of all the chlorinated hydrocarbons.

In the egg stage, 0.1 percent CO-RAL gave a 100 percent reduction in hatchability, while 0.5 percent lindane gave only 81.2 percent. The toxic effects of DDT and DMDT were approximately equal. A 5 percent suspension of DDT caused a 26.3 percent reduction in the viability of eggs and a 4 percent DMDT reduced the viability by 27.6 percent.

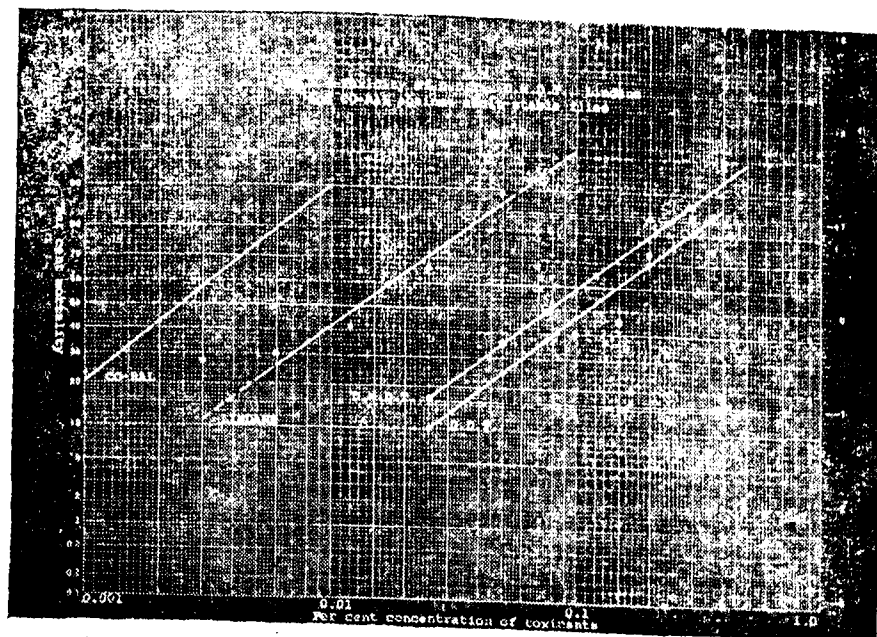


Fig. 1

No data have been given for the toxic effects on larvae because the few tests run were inconclusive. In the pupal stage, 0.5 percent lindane reduced the emergence of flies by 83.7 percent, 0.6 percent CO-RAL by 9.7 percent while 5 percent of DDT and DMDT gave very insignificant results.

Discussion

In this experiment, a 0.0025 percent concentration of CO-RAL caused 50 percent mortality (LD_{50}) of the flies in 24 hours as compared to DDT which gave a similar kill at 0.11 percent concentration. CO-RAL was 44 times as toxic as DDT. Such a high toxicity of CO-RAL to the adult stable flies is due to the inherent toxicity of the compound plus a high natural susceptibility of the flies themselves.

The insignificant effects of 0.6 percent CO-RAL in reducing the emergence of flies from the puparia is due to its poor penetration through the tough cuticle of the puparia. The hatchability of eggs was

appreciably reduced by CO-RAL. This is due to a difference in the chemical composition of the egg shell from the cuticle of the puparia. The egg shell lacks chitin, which has caused a better penetration of the compound making it more effective in this case.

Among the chlorinated hydrocarbons, lindane was the most toxic material to adult stable flies. This is due to inherent toxicity of the compound and its effective penetration of the insect body. According to Metcalf (1955) the absorption of lindane by insects cuticle is proportionate to the solubility of lindane in the cuticle wax. The effectiveness of lindane in reducing the emergence of flies from the puparia is also attributed to the efficient penetrating properties of this compound in comparison with other toxicants.

The lower toxicity of DDT is due to its rapid metabolism forming the non-toxic metabolite DDE inside the body of the flies. Like many other insect species, strains of which have developed resistance to DDT, the stable flies used in this experiment might have developed resistance to DDT and hence less susceptible than wild stable flies tested by others.

The LD_{50} studies, made by this experiment shows that the relative toxicity of these insecticides to *Stomoxys calcitrans* can be arranged in the following order: CO-RAL > gamma-BHC > DMDT = DDT.

Methoxychlor was more toxic than DDT to the adult stable flies. It had a rapid knock down action too. Due to its lesser toxicity to mammals and higher life, it is the safest of the chlorinated hydrocarbons and can be effectively employed for controlling stable flies.

Summary and conclusions

The technique for testing the insecticides against various stages of the stable fly was described. The toxicity tests were conducted with a spray application method by which measured quantities of insecticides in suspension (4 ml.) were sprayed on the adult stable flies, their eggs, larvae and pupae. The insecticides tested were DDT, DMDT, gamma-BHC and CO-RAL.

The percent mortality of adult stable flies, obtained at the end of 24 hours was used to compute the probit curves from which LD_{50} 's were calculated.

According to these investigations, CO-RAL exhibited the highest toxicity against the adult stable fly and its eggs while lindane had best effects in reducing emergence of adult flies from the pupae. Although DMDT was slightly more effective than DDT to the adult flies, the two toxicants had almost similar toxic effects on the various other stages of the stable fly.

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SALMONELLOSIS IN POULTRY IN ORISSA

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In recent years *Salmonella* infections in poultry have been recognised amongst major infectious diseases in this country resulting in heavy losses both in farms and in villages. The first case of *Salmonella gallinerum* infection in India was recorded by Cooper and Naik (1931). Extensive survey undertaken by Iyer (1945) gave little evidence of the disease being present in the Government poultry farms in India at that time. Rao (1946), Iyer and Rao (1951, 1952) and Dixit (1951, 1952) are among workers who recorded outbreaks in poultry caused by *S. suispestifer*; *S. aertrycke* and *S. suispestifer*; and *S. typhimurium* (*aertrycke*) and *S. anatum* respectively. Rao *et al.* (1952) recorded the first outbreak of Fowl Typhoid occurring in an epornitic form among young adults in a poultry farm of North India. In recent years many hitherto unrecognised *Salmonella* serotypes have been isolated. Thus in poultry the isolation of *S. litchfield* (Rao, 1955), *S. welterwerden* (Rao and Gupta, 1958, cited by Rao, 1960a; Sharma and Singh, 1960), *S. dublin*, *S. newport*, *S. concord* (Rao and Gupta, 1958, cited by Rao, 1960a), *S. poona* (Gupta *et al.* 1958), *S. bovismorbificans* (Pande and Neelakantan, 1953), *S. alachua* (Das and Jayaraman, 1955) and *S. champagne*, *S. chester*, *S. hvittingfoss*, *S. pomona*, *S. richmond*, *S. sandigo* (Sharma and Singh, 1960) has been reported from different disease processes as well as from healthy carriers. In west Bengal *S. pullorum* and *S. aertrycke* infections in poultry have been reported by Das *et al.* (1959). Many workers in India including the authors believe that following

uncontrolled import of chicks from Western countries, the disease has spread widely throughout the country and the magnitude of loss from this disease is expected to be indeed very high in the coming years unless a strict eradication programme is followed immediately. This paper puts on record some observations on *S. gallinerum-pullorum* infection in poultry in Orissa.

Observations

Incidence:—As early as 1951-52 sporadic deaths among pullets in the Central Poultry Farm of the State at Angul were observed to which no definite cause could be attributed. Symptoms were characterised by inco-ordination, tremor, high temperature and death. During the following years the death roll had fallen considerably, but cases of yolk peritonitis were very frequently encountered at autopsy. Routine testing of sera of all birds of the farm with *S. pullorum* quick antigen revealed 63 (2.7%) reactors, 57 females and 6 males, out of a total of 2,331 birds.

Postmortem findings:—Fiftyeight reactor birds were sacrificed and at autopsy lesions in different organs as detailed below were found:

TABLE

Distribution of lesions in Fowl Typhoid carriers

Enlarged liver with or without haematoma or gangrene	Enlarged spleen with or without haematoma and gangrene	Nodules on Myocardium or adherence of pericardium to myocardium	Ovarian lesions, cystic, gangrenous or pedunculated	No visible lesions
31	17	10	20	9

Out of 43 hens autopsied the ovary was found to be functioning in 28, while in 6 cocks two had well developed testis.

Isolation and characterisation of the casual agent:—Using the routine cultural techniques (without the use of enrichment media) *S. gallinerum-pullorum* could be isolated almost in pure culture from the liver, ovum and egg yolk of a portion of reactor birds and it was seen that in oldstanding lesions the organisms were found mixed with several contaminants, the most important of which was *Bacterium coli*. On one occasion a pure culture of *S. gallinerum-pullorum* was isolated from a cyst of the size of a hen's egg lodged on the peritoneal surface of the central zone of the wall of the oviduct.

In reactor birds a good method for primary isolation was to pipette out the entire yolk from a mature ovum at *postmortem* or from the egg(s) laid and inoculation of the material into about 200 ml,

nutrient broth in a flask with the help of a widebore sterile pipette and incubation at 37°C for 18 hours at the end of which growth, if any, was plated out on MacConkey's Agar for selective isolation of the organism. The method had the advantage of less chances of contamination and did not require the use of enrichment in view of the large quantity of the inoculum and medium used.

In 6 carrier hens attempts were made to isolate the organism from their eggs using the technique described above and it was seen that two birds laid infected eggs, working out a percentage of approximately 33% of the reactor females. To find out the frequency with which these two carrier birds lay infected eggs the eggs laid by them in a week were cultured. The results were rather irregular but on an average one egg out of three laid successively by a reactor bird was infected.

Morphologically the organism was a Gram-negative coccobacillus measuring 2 to 3 μ X 1.0 to 1.5 μ and nonmotile. Biochemically, it did not ferment lactose, but glucose, maltose, mannite, dulcitol, arabinose and xylose were fermented within 18 to 36 hours without gas production. Acid production in maltose and xylose was slow, whereas in dulcitol it was very slow and slight. It was also observed that in agglutination tests, the culture isolate reacted weakly with standard Pullorum Serum supplied by the I.V.R.I. as compared with the pattern of agglutination seen in respect of standard *S. pullorum* strain. These observations led Das (1953), who isolated this strain, to believe that this was either an intermediate or variant strain of the serotype *S. gallinerum-pullorum*. This was confirmed later by Rao (1955) by serological means as the only strain of its kind isolated in India so far.

Pathogenicity tests were carried out in two *Desi* cockrels of 6 months age by intramuscular and intraperitoneal injection of 1 ml. of the culture suspension of density 4 times Brown's capacity tube 4 and the birds were observed for 12 days, but they failed to succumb to the infection. Serum of one of the two birds, however, showed a feeble (one +) reaction in the plate agglutination test.

Discussion

The importance of Salmonellosis is too well known to need any emphasis. The isolation of *S. gallinerum-pullorum* on several occasions from infections in poultry in different parts of India indicates the need for more systematic survey and investigation into the problem. The occurrence of a variant strain of this organism in Orissa poses the question whether such variants occur in other States as well and this has to be investigated in all cases of *S. gallinerum-pullorum* infections

encountered in future. Biochemical variants are known to have been isolated in natural infections (Kauffmann, 1934) but serological variants have been isolated only occasionally. It is of utmost importance to note that such variant strains may be responsible for infection which may not always be detectable by agglutination test which is frequently used for picking out carrier birds. This is due to the fact that the variant strains possess excess of XII₂ factor which the normal strains lack either partly or completely (Edwards and Bruner, 1946; Wright and Edwards, 1948). However, the Canadian strain that is presently in use for preparing *S. pullorum* quick antigen by the I.V.R.I. is said to possess this factor and as such is expected to detect infections caused by variant strains also (Rao, 1960 b). But to what extent this will be useful under field conditions in India has got to be assessed.

Summary

The isolation of a variant strain of *S. gallinerum-pullorum* from young adult reactor fowls was reported for the first time in India by Das (1953) and details of a similar infection are recorded here.

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EFFICIENCY OF FEED UTILIZATION OF THE DESI PIGS FROM WEANING TO TWENTY TWO WEEKS OF AGE ON "FARM" AND "CHEAP RATIONS"

By

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Introduction

Very scanty information is available in our country as regards the growth rate and the efficiency of feed utilization of the *Desi* pigs. An experiment was designed to find out the growth rate and the efficiency of feed utilization of the *Desi* pigs kept on two different types of rations, a farm ration which can be made available under farm conditions and a comparatively cheaper village ration which a villager can afford to feed the pigs with. The results of the study are included in this paper.

Review of Literature

Agarwala (1958) obtained an average daily gain in weight and an average feed intake for a pound of increase in weight as 0.62 and 2.92 lbs. respectively with *Desi* pigs raised on farm ration. Similar studies with the Yorkshire graded pigs under Indian conditions have been reported by Agarwala and Sundaresan (1956), Reed and Agarwala (1956), Sundaresan and Agarwala (1957), Sundaresan and Tandon (1957), and Tandon (1958).

Experimental Procedure

Ten *Desi* piglings each of about two months of age were purchased for this study. These piglings were divided in two groups (Farm Ration and Cheap Ration) by arranging them in pairs according to sex, size and general health. Male piglings of each group were castrated the day the experiment was started. Piglings of each group were kept in *pucca* pens all the time and were fed *ad lib.* throughout the entire period (14 weeks) of the study.

The composition of "Farm" and "Cheap" rations is given in table I and the distribution of the piglings to each group is given in table II.

TABLE I
Composition of Ration

Constituents	Farm Ration (%)	Cheap Ration (%)
Groundnut cake	47	60
Wheat bran	20	40
Maize	15	—
Gram	15	—
Mineral mixture	3*	3**
Shark liver oil (Trivax)●	2 oz/md	2 oz/md
Cost per maund during experimental period Rs. 11.29 Rs. 9.62		

● Trivax brand shark liver oil contains 6000 i.u. of vitamin A and 600 i.u. of vitamin D₂ per gramme.

* This consisted of 50 parts common salt, 50 parts steamed bonemeal and 0.03% potassium iodide.

** This consisted of 50 parts common salt and 50 parts slaked lime.

TABLE II
Distribution of Piglings to the Groups

"Farm" Ration			"Cheap" Ration		
Notch No.	Sex	Initial Weights (lbs.)	Notch No.	Sex	Initial Weights (lbs.)
3	Castrated	7.5	1	Castrated	7.5
8	"	6.0	5	"	8.0
10	"	9.0	7	"	6.0
2	Female	5.0	4	Female	6.0
9	"	5.5	6	"	5.5
Total		33.0			33.0

Results and Discussion

A summary of the findings comparing the economics of the two groups is given in table III.

TABLE III
Economics of Growing Pigs in the Two Groups

	"Farm" Ration (lbs.)	"Cheap" Ration (lbs.)
Average initial weight per pig	6.60	6.60
Average final weight per pig	32.50	21.00
Average daily gain in weight	0.26	0.15
Average daily feed intake per pig	1.35	1.28
Average feed intake per lb. of gain in weight	5.11	8.69

Following the method of Snedecor (1957) the differences in total weekly weights between the two groups were statistically analysed and the results of analysis are given in table IV.

TABLE IV

Results of the Statistical Analysis of the Differences of the Total Weekly Weights of the Two Groups

SD ²	331.05
d	20.36
Sd ²	22.07
d	4.69
DF	14
t	4.340

t for 0.01 is equal to 2.97

The following conclusions may be drawn from table III. The "Farm", ration gives 0.11 lb. more daily gain per pig with increased daily feed of 0.07 lb. per pig over "Cheap" ration. The average feed intake for a pound of gain with "Cheap" ration is 3.58 lbs. higher than that with "Farm" ration.

The differences in body growth as measured by the weekly weights (table IV) are found to be statistically significant for pigs raised on "Farm" than for those raised on "Cheap" ration. This shows that the "cheap" ration is quite inferior for growing pigs as far as the growth and the efficiency of feed utilization are concerned.

Summary

A study was undertaken to investigate the difference in growth and the efficiency of feed utilization of the *desi* pigs raised on two different rations from weaning to fourteen weeks duration. *Desi* pigs raised on "Farm" ration were found to be superior to those raised on "Cheap" ration in growth rate and the efficiency of feed utilization. The weekly growth on "Farm" ration was found to be significantly superior to that on "Cheap" ration.

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AGE AT FIRST CALVING AND INTERCALVING PERIOD IN CROSS BRED COWS WITH VARYING AMOUNTS OF RED SINDHI AND JERSEY BLOOD

By

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It is observed that heifers of Indian Breeds mature much later than those of European breeds. Consequently their age at first calving is delayed. There is also a general belief that the intercalving period among Indian breeds of cattle is greater than that in the exotic breeds.

The average age at 1st calving in Red Sindhis was reported as 40.5 months at Hosur (Amble 1958), 44 months at Hosur (Rajagopalan 1952), 42.9 months at the National Dairy Research Institute, Bangalore (Venkayya *et al* 1956); 41.7 months at the National Dairy Research Institute, Bangalore, (Amble 1958); 41 months at Karachi (F.A.O. 1953); 35.5 months at Phillipines (F.A.O. 1953) 42.5 months at Allahabad (Sundaresan) and that in pure Jerseys as 28.4 months in Egypt (Kishin *et al*); 30 months at Allahabad (Sundaresan 1954) and 30 months in Ceylon (Mahadevan 1956).

The calving interval in Sindhi herd bred at Hosur was 18 months and about 15 months for the foundation stock and 447±8 days, at Bangalore (Amble 1958); 15 months in Phillipines (F.A.O. 1953). The average calving interval worked out by the Madras Animal Husbandry Department Statistician for Hosur Sindhi herd is about 18 months. For Jersey it is stated that the calving interval is about 13 months in Egypt (Kishin) and the same at Allahabad (Sundaresan 1954).

From the above, it is clear that the figures reported are not uniform for the same breeds probably due to methods of investigation and or animal husbandry practices being different in different places. When the same breeds were studied at different farms, strain differences may also be a contributory factor. It is obvious that the exotic breeds calve when they are a little over 2 years while the Red Sindhis are found to calve only above 3 years.

The Madras Race Club maintains a Dairy herd with cross bred Sindhis. The farm acquired 3 pure bred Jersey cows in 1934 and they were crossed by pure Red Sindhi bulls. Their progeny were also crossed by pure Red Sindhis. Thus the animals studied were Sindhi Jersey crosses. The animals have plenty of grazing facilities and the husbandry practices are satisfactory.

A study of the age at 1st calving and intercalving periods was made and they have been subjected to statistical analysis. The race club was selling off its surplus stock of females every year and at present there are only 25 cows of various grades. For study purposes 34 first calvings and 131 intercalving periods which occurred during the past 25 years formed the basis for analysis.

As the Red Sindhi bulls used were obtained either from Hosur or from Sind, the age at first calving and intercalving period observed in those places were taken as standard.

Age at first calving

TABLE I

Showing the effect of crossing on age at 1st calving.

Generation	No. of heifers studied	Minimum in months	Maximum in months	Average in months
1	5	20	32	26.6
2	9	20	41	29.1
3	14	35	39	35.1
4	6	35	40	38.8

It is noticed from table I that on crossing Jersey with Red Sindhi bulls the progeny showed a gradual increase in their age at first calving viz., 26.6 months for 1st generation; 29.1 for second generation, 35.1 for 3rd generation and 38.8 for 4th generation. The average age at first calving for pure Sindhi at Hosur and Sind is about 41 months. The analysis showed a gradual rise in the figures from foundation Jersey to 4th generation of Sindhi Jersey crosses and it was found to be increasing with the increased amount of Red Sindhi blood. Individual variations are noticed. In some cases the maximum age has been as high as 41 months and in some as low as 20 months. But on statistical analysis the variations were found to be significant ($P < .5$). McDowell *et al* (1959) stated that upto 75% Sindhi inheritance did not materially affect reproductive performance in the herds; but that there are some indications that the increased Sindhi inheritance did tend to retard the age at maturity and hence that at first calving. It is evident therefore that with increasing amount of Red Sindhi blood, the age at first calving is delayed and the statistical analysis made has revealed it to be significant.

Inter-calving period

131 inter calving periods spread over a period of 25 years in 5 generations were studied and their group average is given in table II,

TABLE II

Showing effect of crossing on intercalving period.

Generation	No. of intercalving studied	Minimum inter-calving period in months	Maximum inter-calving period in months	Average inter-calving period in months
1	7	11	17	13.5
2	22	11	17	13.05
3	42	10	20	13.4
4	49	10	20	13.4
5	10	12	16	13.5

The average intercalving period for pure Jersey is 13 months (Kishin; Sundaresan 1954) and that for Sindhi is 18 months (Amble 1958) at Hosur. Amble (1958) has stated that the figures are higher than that in Bangalore by about 94 days for the 1st calving interval and 78 days for the subsequent calving intervals.

At the Madras Race Club Dairy, although individual variations were noticed, statistical analysis showed that the variations were not significant between the generation of Jersey, Jersey X Sindhi and Sindhis. Hence it is assumed that the intercalving period does not change with breed to breed and is dependent probably on husbandry practices.

Summary

1. Foundation stock of pure Jersey cows acquired by the Madras Race Club in 1934 were crossed by four Sindhi bulls and the subsequent generations of this stock were back crossed with pure Sindhi bulls. The statistics of these generations spread over a period of 25 years have been analysed regarding the age at 1st calving and periods between calvings.

2. When Jersey cows were crossed by Sindhi bulls, the progeny showed, as generations advanced gradually increasing age at first calving inclining towards that of Sindhi, whereas the intercalving periods were not altered.

3. It would therefore appear that the age at first calving is specific to the breed whereas the intercalving period is common to both the breeds.

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EFFECT OF THE SEX OF BUFFALO CALVES ON THE ECONOMIC TRAITS OF THEIR DAMS

By

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Many workers endeavoured to work out the significance of the sex of calf in relation to the length of gestation period in buffaloes. Arunachalam *et al* (1952), Lal and Rizvi (1959) and Reddy and Ramakrishna (1960) suggested that the sex of calf does not influence the length of gestation period to any significant level. However, there does not seem to be any information about the influence of the sex of calf on the economic traits — like milk yield, lactation period, inter-calving period and dry period of their dams.

The present study, therefore, was attempted to find out the effect of the sex of calf on their economic traits. The data were collected from the college Dairy Farm.

Results and Discussions

1. Effect of the sex of calf on the length of lactation period :—

The result of 446 lactations revealed that there was not any significant effect of the sex of calf on the length of lactation period of the dams (Table I). The average lactation periods for 216 males and 230 female calvings were 337.467 days and 334.934 days respectively.

2. Effect of the sex of calf on the milk yield :—

The average milk yields for 216 male and 230 female calvings were 4222.564 lbs. and 4199.291 lbs. respectively. The difference between those two performances was not significant statistically (Table II).

3. Effect of the sex of calf on the length of inter-calving period:

The average inter-calving periods for 178 male and 191 female calvings were 476.337 days and 479.638 days respectively. The difference, however, was not statistically significant (Table III).

4. Effect of the sex of calf on the length of dry period :—

The average length of dry periods for 174 male and 191 female calvings were 141.258 days and 145.952 days respectively. The sex of the calf, however, was not responsible to any significant level to cause any variation in the dry period (Table IV).

5. Effect of the sex of calf on the length of gestation period :—

The average length of gestation periods for 102 male and 117 female calvings were 309.647 days and 309.136 days respectively. The difference between the gestation periods of male and female calvings was found not significant (Table V).

TABLE I

Analysis of variance of the effect of the Sex of Calf on the length of lactation period of Dams.

Sources of variation	D.F.	S.S.	M.S.S.
Total	445	6654108.38	
Between sex	1	714.57	714.57*
Within sex	444	6653393.81	14985.1

* Not significant at $p \leq 0.05$

TABLE II

Analysis of variance of the effect of the Sex of Calf on the Milk Yield of Dams.

Sources of variation	D.F.	S.S.	M.S.S.
Total	445	875693171.1	
Between sex	1	226870.3	226870.3*
Within sex	444	875466300.8	1971545.8

TABLE III

Analysis of variance of the effect of the Sex of Calf on the intercalving period of Dams.

Sources of variation	D.F.	S.S.	M.S.S.
Total	368	11448056.22	
Between sex	1	1004.36	1004.36*
Within sex	367	11447051.86	31190.87

TABLE IV

Analysis of Variance of the effect of the Sex of Calf on the Dry period of Dams.

Sources of variation	D.F.	S.S.	M.S.S.
Total	365	2843180.37	
Between sex	1	2006.43	2006.43*
Within sex	364	2841183.94	7805.45

TABLE V

Analysis of variance of the effect of the Sex of Calf on the Length of Gestation period of Dams.

Sources of variation	D.F.	S.S.	M.S.S.
Total	218	147085.25	
Between sex	1	14.13	14.13*
Within sex	217	147071.12	677.74

* Not significant at $p < 0.05$

The results indicate that the sex of the calf is in no way a significant factor to cause any deviation in the normalities of the performances of the dams, regarding average lactation period, milk yield, inter-calving period, dry period and gestation period. Many workers dealing only with the effect of the sex of calf on gestation period, have expressed the result that the gestation period of buffaloes is not influenced to any significant level by the sex of the calf. The present finding is in agreement with these results.

Summary

A study of the effect of the sex of calf on lactation period, milk yield, inter-calving period, dry period and gestation period was undertaken in Murrah buffaloes. It was observed that the sex of the calf was not responsible for causing any significant variation in the averages of these characters.

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Clinical Articles

PERINEAL HERNIA AND ITS SURGICAL CORRECTION

By

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Introduction

Perineal Hernia as seen in the dog has been defined as the failure of the supporting structures of the pelvic outlet to contain the pelvic organs. It appears to be a breakdown of the areolar tissues between the bowel and the surrounding pelvic musculature with separation occurring between the coccygeus medialis and anal sphincter muscles and associated with a weakening of the perineal fascia. It occurs in the latter half of life and most frequently in male dogs. It is reported to be due to endocrine dysfunction and is common in breeds with rudimentary tails.

Case History

An Alsation dog aged six years was admitted as an In-Patient in the Small Animals Clinic on 3-12-1961 with the history that a swelling had developed on the right side of the anus, a fortnight ago.

Diagnosis

Palpation revealed unilateral perineal hernia. The hernial contents were easily reduced with slight manual pressure on the hernial sac after lifting up of the hind quarters.

Treatment

The dog was kept under observation and during this period it had severe constipation.

Differential count revealed :—

Neutrophils — 47%

Lymphocytes — 41%

Eosinophils — 12%

and the haemogram

Haemoglobin — 12 gms%

Red Blood Cells — 6.1 millions/ccm.

White Blood Cells — 5900/ccm.

The urine contained traces of bile pigments. This condition was therefore first treated. As the scrotum showed slight erythema and ulceration, orchiectomy could be performed only on 26-12-1961. For premedication 50 mgms of Largactil, 2 hours prior to the operation, was administered orally.

Operative Technique

Stage I—Orchiectomy by Suture Method:—Orchiectomy was performed by the open ligature method. The Scrotal skin between the two incisions for the removal of the testes, along with part of the Scrotal Septum was resected. The Scrotal edges were opposed and coopted with interrupted wire sutures. These sutures were removed on 3-1-1962.

Stage II—Reduction of Hernia:—On 7-1-1962 the Surgical correction and repair of the perineal hernia was performed.

The preoperative treatment consisted of keeping the bowels loose for a period of 3 days. A deep enema was administered late in the night, prior to the operation date, to empty the colon and rectum.

Largactil 25 mgms was administered on the operation day an hour prior to the administration of general anaesthesia. General anaesthesia was induced by the intravenous injection of 12 grs of Nembutal in 12 cc. of aqua distillata. A purse string suture was applied to the anus and the anal orifice was occluded by tightening the same. The operation site was closely clipped and after the surgical scrub of the perineum and the gluteal area, the animal was laid on the operation table.

Positioning

The animal was placed in lateral recumbency with the head down. The orthodox position for the operation, Ventro-dorsal recumbency, was not followed.

Surgery

The operation site was sterilised and draped. A crescentic skin incision 5" long was made on the centre of the hernial swelling, the incision extended both above and below the swelling with the convexity towards the hip. The skin was reflected medially to the anal sphinctor. This exposed the perineal fascia over the region. This fascia was thinned out at the centre. It was incised at the centre avoiding the vascular sheath containing the posterior haemorrhoidal artery and nerve. The hernial sac was explored and the contents herniated were a portion of the rectum and retroperitoneal fat. The coccygeal muscle was ruptured but the retractor ani was intact. For repair of the hernia the organs were replaced after excising the adipose tissue. The ruptured coccygeus muscle was carefully opposed by mattress and interrupted sutures with *Vetafil fine* and anchored to the retractor ani and a portion of the fascia. The perineal fascia was trimmed and opposed with a row of continuous sutures. The repair was tested by tilting the table and was found satisfactory. The skin was finally trimmed and the edges opposed by interrupted wire sutures. The purse string suture on the anus was removed. The dog was removed to the kennel.

Post Operative Care

The patient recovered from anaesthesia late in the evening. The bowels were kept open by giving laxatives daily till the 20th when the sutures were removed. Parenteral antibiotic therapy was initiated and maintained for a period of 5 days. Due to manipulation and trauma only wet healing could be achieved but chances of further infection were controlled by exposures to Ultra Violet radiation. At the time of discharge, on 22-1-1962 the dog had considerable fibrosis at the site of operation, but no recurrence of the hernia was noticed.

Conclusion

Perineal hernia usually occurs in old uncastrated male dogs. In this particular case the animal was only 6 years old and was in good condition. No prostatic enlargement could be detected and there was no history of any urinary incontinence. The animal was easily excitable and considering the general condition of the animal and the age, the cause of the hernia can only be attributed to trauma.

Summary

1. A case of perineal hernia in a six year old Alsation is recorded.
2. The hernia was probably traumatic in origin.

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RECTAL ABSCESS IN CATTLE

By

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Diseases of the alimentary system are of common occurrence in both animals and man irrespective of age and sex. Such affections as inflammations, ulcers and tumours are frequently encountered. Johnson and Donald (1957) reported the occurrence of tumours in rumen and reticulum of cattle. Pinsent (1955) recorded the formation of periintestinal abscess in a gelding. Affection of that part of the alimentary system known as the rectum is common in man but rare in domestic animals with the exception of the dog (Miller and West 1953) and the horse in which also rectal abscess has been reported to be fairly common (O, Connor 1946).

Diseases of the rectum appear to be uncommon in cattle. So far no case of rectal abscess in cattle appear to have been reported in available literature. One such case has been encountered by the author which is recorded below.

Subject

A working Haryana bullock, aged eight years.

History

The bullock was in good condition and was working satisfactorily in the plough. Suddenly it became ill and was found dull and depressed with reduced appetite. The owner remained indifferent and was expecting spontaneous recovery. But on the contrary the condition of the patient worsened and it was subsequently presented at the hospital for treatment.

Symptoms

The bullock had intense abdominal pain. The pain appeared in spasms repeated every ten to fifteen minutes. The temperature was 102.6°F. The pulse was normal. The respiration was accelerated. The mucous membranes were injected. The coat was dry and staring. He was completely off feed but drank water now and then. The patient was highly constipated. However faeces was occasionally passed which was scanty and hard in consistency. The animal usually evidenced signs of much distress particularly when it attempted to defecate. During the act of defecation out of probably excruciating pain, it was virtually inclined to come down on its hind legs, in the manner of the sitting posture of dogs. The predominating symptoms comprised of abdominal pain associated with spasmodic colic. When the spasms occurred the animal became extremely restless

and assumed the recumbent position so common with horses affected with colic but rarely met with in cattle associated with the same disorder.

Treatment

In order to relieve pain an anodyne draught consisting of Asafoetida-half ounce, Chloral Hydras-half ounce Ol. Terebinth-one ounce, and Linseed Oil-one pound was administered. It was repeated the next day also but the animal made no response.

The third day it was given digestive powder consisting of Pulv Ajvain-four ounces, Pulv Gentian-four ounces, Pulv Aniseed-four ounces, Pulv Ginger-four ounces, Black salt-four ounces, Black pepper-two ounces, and pulv Nux Vomica-one and half ounces. Four ounces of this powder was given in one pound of water in the morning for two days. The owner reported considerable relief after this. With treatment for three days with half the above doses, the animal was considered to have recovered and it was discharged.

After ten days the animal was reported to have gradually fallen sick. The symptoms exhibited were the same but they were exaggerated and more distressing. The condition powder was resorted to, but proved fruitless. The animal became very weak and was reduced to skin and bone. The constipation became more pronounced and little or no faeces was passed. In order to evacuate the bowel, soap water enema was given. As soon as the lubricated palm of the hand was inserted into the rectum to effect back-raking, the rectum was found to be considerably inflamed resulting in almost complete closure of the luminal passage. Further on the left lateral wall of the rectum about four inches from the anus a big abscess had developed which was mature and pointing.

The abscess burst out easily with a little digital pressure. The pus was evacuated by irrigation with 2% dettol lotion. There was a deep cavity measuring about 2 inches in diameter. Twenty lac unit of procaine penicillin was injected Intra-muscularly and one pound of ol. Ricini was given internally. The next day the animal showed relief. The abdominal pain was reduced. Defecation caused little pain. With the exception that after two days Ol. Ricini was replaced by digestive powder, this treatment was continued until the animal recovered completely which took place in seven days.

Summary

A case of rectal abscess in a bovine is reported.

2. The striking symptoms of this condition were colicky pains akin to equine colic, constipation and during defecation the animal used to come down on haunches.

3. The abscess on being opened, by digital pressure, drained and treated antiseptically locally and with antibiotics generally, led to an uneventful recovery.

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Abstracts

Vaccination of pregnant cattle with Infectious Bovine Rhinotracheitis vaccine—By V. B. ROBINSON *et al.*—*Vet. Med. Vol. 56, No. 10, October, 1961.*

The clinical manifestations of both infections bovine rhinotracheitis (IBR) and bovine virus diarrhoea (BVD) include abortions in spontaneous outbreaks. The authors collected data from 39 herds in 6 States which showed that no post vaccination abortions occurred in a total of 1,549 pregnant cattle vaccinated with a modified live virus, infectious bovine rhinotracheitis vaccine (Rhivax). In 3 of these herds abortions associated with IBR (2 herds) and IBR and BVD (1 herd) occurred before vaccination. In 3 other herds in which abortion did occur some time after vaccination with Rhivax, laboratory and clinical data indicated that BVD infection was the cause of abortions in each case. Serologic and clinical evidence of IBR or BVD infection as the probable cause of abortions was obtained in 18 herds that had not been vaccinated against IBR.

A. MUKERJI.

Differentiation between Vaccinal and infectious Brucellosis Titres in cattle—By D. E. RODABAUGH and CECIL ELDER. *Vet. Med. Vol. 56, No. 5, May, 1961.*

The development of *Brucella abortus* strain 19 vaccine as an aid in control of brucellosis has greatly augmented the success of programmes for bovine brucellosis eradication. There is, however, one serious drawback to the use of vaccine when using the agglutination test as a means determining the infection status of cattle. The authors

have described a means of differentiating between infectious and vaccinal titres in brucellosis of cattle. The method employed appeared to be specific in a limited number of vaccinated cattle and cattle of known infection status. Application of the technique to more than 200 samples obtained from a brucellosis testing laboratory indicated correlation with herd histories in a high percentage of the samples tested. There was an apparent failure of the differential test when applied to sera of cattle with ascending titres. Further evaluation should be made with many hundreds of blood samples under varying conditions before definite conclusions are drawn.

A. MUKERJI.

Bovine Leptospirosis in Alabama—A Five-Year study—By C. S. ROBERTS, L. W. TURNER, and J. H. LIVINGSTON.—*Jour. of Amer. Vet. Med. Assn., Vol. 139, No. 8, October, 61.*

Of 690 serum samples obtained from the brucellosis laboratory 7% and 24% were positive in the 1:200 dilution or higher to *Leptospira pomona* and *L. sejroe* agglutinins, respectively. *L. sejroe* agglutinins alone in high dilutions were never demonstrated from cattle in herds with a history of recent abortions. *L. pomona* and *L. sejroe* agglutinins were demonstrated in 33% and 34%, respectively, of more than 7,000 bovine serum samples obtained from the Alabama Veterinary Diagnostic Laboratory during a five year period. Positive serologic reactions were also demonstrated with a few other antigenic serotypes of *Leptospira*. Both *L. pomona* and *L. Canicola* serotypes were isolated from cattle, calves, and fetuses.

A. MUKERJI.

Bovine Leptospirosis—A hazard to man.—By P. R. SCHNURRENBERGER, *et al.*—*Jour. of Amer. Vet. Med. Assn. Vol. 139, No. 8, October, 1961.*

It has been amply demonstrated by earlier workers that *L. pomona* infections occur in persons associated with dairy cattle in the United States, but the frequency of transmission is unknown. The present study was undertaken to determine the frequency with which such transmission occurs in Ohio. Forty dairy herds presumed to be infected with leptospirosis were visited and blood samples were collected from 86 persons in contact with these cattle. Two probable infections with *L. pomona* in man were found. Of 155 serum samples from Veterinarians practising large animal medicine in Ohio, one had a titre for *L. pomona*.

A. MUKERJI.

Vitamin Deficiencies Depress Growth and Increase Mortality—By O. J. STUBBS, *University of Stellenbosch, South Africa* has reported that vitamin deficiencies in a starter ration for chickens depressed growth rate by as much as 75%. Mortality in some cases rose as high as 50% upto 4 weeks of age. Most serious retardation of development was caused by the deficiencies of Vitamin A and riboflavin, while the lack of vitamin A and pantothenic acid caused the greatest mortality rate.

Even on a synthetic ration designed to meet the minimum vitamin requirements, chicks only grew half as fast as controls which received a good quality commercial ration. Full results of the research are as follows :

<i>Rational fed</i>	<i>Av. Wt. at 4 weeks (gm.)</i>	<i>Mortality at 4 weeks (percent)</i>
Good commercial ration	226	0
Minimum vit. requirements	111	0
Vit. A deficient	55	50
Vit. D deficient	60	20
Vit. E deficient	92	10
Vit. K deficient	67	0
Riboflavin deficient	56	10
Niacine deficient	84	10
Pantothenic acid deficient	63	50

(*Poultry Digest*, December, 1961)

B. PANDA.

Feather meal in Animal Feed.—Properly processed feather meal can be used to supply up to one-quarter of the protein in chick starting ration containing large amounts of protein from soybean oil meal and corn. Under these conditions the growth is good, amino acid balance is not upset, and dietary nitrogen utilization is not impaired. However, when feather meal is used to supply one-third or more of the total dietary protein, amino acid deficiency problem arises. In experimental diets where corn, soybean oil meal, and feather meal each contributes one-third of the crude protein, supplementation with lysine and methionine is required to restore maximum growth rate. When one-half or more of the protein is contributed by the feather meal, the amino acid deficiencies extend to tryptophane, histidine, arginine and perhaps other amino acids. Feather meal cannot be used indiscriminately as a protein source. Feather meal has also been shown to contain vitamin B₁₂ and unidentified growth factors.

Feather meal can be used as dietary source of protein for swine, sheep and beef cattle although more works need to be done with these animals to establish the usefulness and limitation of this feedstuff.

Processing of feathers should employ conditions of temperature and steam pressure that will result in a meal containing 70% or more of pepsin-hydrochloric acid digestible protein.

(*Utilization Research Report No. 3, USDA, November, 1961*)

B. PANDA.

High magnesium as a Cause of Rickets in Poultry—Rickets in poultry is sometimes brought on by feeding limestone with a high percentage of magnesium, according to Dr. R. D. Creek, University of Maryland. When excess magnesium is present, excitability and diarrhoea are usually noticeable. The problem is more likely to occur in laying hens where extremely large amounts of limestone are added to the diet.

(*Feed Age*, November, 1961.)

B. PANDA.

Sugar can kill nematodes.—Ordinary sugar at rates of one to five percent by weight added to nematode infested soils, killed upto 100% of the nematodes within 24 hours, according to Dr. W. A. Feder of USDA in Orlando Florida State. Additional greenhouse and field tests have confirmed these findings, and further research is underway.

B. PANDA.

Do's and Don'ts of Mastitis Control.—

1. Have all first-calf heifers and newly acquired cows examined for mastitis before placing them in the milking line.

1. Milk clean cows before infected cows.

3. Wash the udder before milking, with a warm chlorine or quaternary ammonium solution using a clean towel for each cow.

4. Use the strip cup before milking each cow.

5. Keep hands and equipment clean while milking.

6. Do not attach milking machine until the milk is let down.

7. Remove teat cups as soon as the animal is milked out.

8. Do not leave excessive quantities of milk in the udder.

9. Avoid excessive variation in routines.

10. Provide adequate bedding in stalls, barns, or sheds.

11. Prevent injuries to the udder by avoiding such conditions as slippery floor, mud holes, high door sills or similar obstructions, and contact with disinfectants.

12. Have udder and teat injuries treated immediately.

13. Have cows affected with mastitis treated, but do not rely on treatment alone; sanitation and good management are important in controlling mastitis.

(*USA Bulletin No. 1422, January, 1961*)

N. SATAPATHY.

News & Views

Fourth World Congress on Infertility will be held at Rio de Janeiro from August 8th to 15th, 1962.

* * *

National Animal Disease Laboratory of U.S.D.A. at Ames, Iowa was dedicated on 14-12-61. This new 16.5 million dollar laboratory located in a 318 acre site will provide for basic and applied studies of the principal infectious animal diseases prevalent in U.S.A. and will serve an impressive goal — a national animal population as free from disease as possible. The laboratory will employ about 500 persons of whom one fifth will be scientists, trained in the modern team approach to problems. Facilities are provided for the simultaneous study of 25 different animal diseases. The Director of the new laboratory is Dr. W. A. Hagan, the author of that popular book "The Infectious Diseases of Domestic Animals" and former Dean of the New York State Veterinary College.

J.A.V.M.A., Jan. 15th, 1962.

* * *

Use of Radioisotopes in Animal Biology :—A conference on the use of radioisotopes in animal biology and the medical sciences, sponsored by the International Atomic Energy Agency, the World Health Organisation and the Food and Agriculture Organisation of the United Nations, was held recently in Mexico City. More than 200 scientists from 32 countries including India attended the conference which investigated recent progress in the use of radioisotopes as tracers in exploring the life processes of human-beings and animals. Eighty scientific reports were submitted to the conference dealing with recent laboratory work in 17 countries.

J.A.V.M.A., Jan. 15th, 1962.

* * *

Dr. Bertie A. D'Souza, G.M.V.C., B.V.Sc., M.S. :—The post of the Principal, Madras Veterinary College has recently been up-graded to that of a 'Dean', to befit the status of that famous College, which has blossomed into a full-fledged Post-graduate centre of learning in all branches of Veterinary science. The present Principal, Dr. Bertie A. D'Souza has rightly been promoted to the new post. We most heartily congratulate him and wish him all success in his new capacity!

* * *

Dr. M. C. Chellam, G.M.V.C., F.R.V.C.S. :—Similarly the post of the Vice-Principal has been up-graded to that of an Associate Dean and Dr. M. C. Chellam, Professor of Gynaecology of the Madras Veterinary

College has been promoted to the new post. We wish him all success in his new assignment. Madras has given the lead and let us hope other States would soon follow.

* * *

Dr. S. Padmanabha Rao, G.M.V.C., B.V.Sc., M.V.Sc. :—We are extremely grieved to learn of the sudden and premature demise of Dr. Padmanabha Rao, who was working as Assistant Lecturer in Pathology at the Andhra Veterinary College, Tirupati due to heart attack. We offer our heartfelt condolences to the members of the bereaved family.

* * *

Schering Veterinary film wins top award :—A veterinary film illustrating a new surgical technic was named the best professional medical class film of the year by the Biological Photographical Association at its September meeting in Chicago.

Titled "Respiratory problems in Brachycephalic dogs", the film shows Dr. Harmon C. Leonard of Cheshire, Conn, performing surgery to correct obstructed air passages involving the nostrils, soft palate, and larynx. Dr. Leonard also narrates the film, which was produced by the Veterinary Division of Schering Corp.

Eight hundred entries from the United States and 22 other countries were made in Medical, Veterinary, Research and other categories in the international film competition.

Mod. Vet. Med. 42 (21) — 24.

* * *

Now — A human case of African Horse Sickness found in Iran :—Dr. Nels Konnerup, Economic Research Service, U. S. D. A., recently reported that an International Cooperation Administration airgram contained in part: "Recent discovery of African Horse sickness in humans (one case) by Razi Institute has dictated a whole series of news tests which are being made by Razi in co-operation with U. S. Army Hospital, Tehran." Dr. Konnerup said that as far as he knew this is the first case of the disease reported in humans. *Mod. Vet. Med.* 42 (22) — 21.

* * *

Wellcome Foundation produces one vaccine for seven diseases :—London, England.—It was announced in October that the Wellcome Foundation Ltd., has produced a vaccine, "covexin" which is capable with one injection, of immunizing sheep against seven diseases — pulpy kidney, lamb dysentery, tetanus, black-leg, malignant oedema, necrotic

hepatitis and hemorrhagic entero-toxemia. The vaccine can be injected at any time. It is a little more expensive than the vaccine for the prevention of a single disease; two injections a year are necessary at a cost of 42 cents for the two.

This is the first time in either human or veterinary medicine that it has been possible to control seven different diseases with one vaccine. *Mod. Vet. Med.* 42 (23) 23.

* * *

International Association of Veterinary Food Hygienists:—3rd symposium, Nice, France, 1962:—Invitations, registration forms and preliminary programmes concerning the above symposium can now be had on application to Mr. G. S. Ferguson, Secretary of the Association of Veterinary Food Hygienists, Department of Veterinary Hygiene and Preventive Medicine, Royal (Dick) School of Veterinary Studies, Summerhall, Edinburgh, 9. *Vet. Rec.* 74-47.

* * *

An "International meeting on cattle diseases" will be held at the Vienna Veterinary College in Austria on May, 17, 18 and 19, 1962. Cattle diseases will be discussed from the view point of new research findings, clinical results, pathological findings, diagnosis and therapy.

* * *

The World Veterinary Congress, 1963 will take place in Hanover, West Germany from 14th to 21st August.

* * *

Retiring age of Scientists:—Prof. M. S. Thacker, Director General, Council of Scientific and Industrial Research, said recently "the services of technical and scientific personnel should be normally continued upto their 58th year instead of 55 as at present. The country is expanding at a rapid pace but technical personnel fall short of requirements". This is a point which has been stressed time and again by eminent people but the ways of the Government are mysterious. The less we say about it, the better. It is far better to raise the retiring age to benefit everybody in service, instead of relaxing the existing limit in the case of a few individuals, which naturally leads to adverse comments and heart-burning.

Association News

The Indian Veterinary Association

THE RESERVE FUND

An event of great importance to the Veterinary profession in India, took place in August 1924. It was the birth of the *Indian Veterinary Journal*. Circumstances were positively hostile and yet the profession took that bold step and the lion-heartedness of the early pioneers cannot be too highly praised. Ever since then, the *I.V.J.* has toiled hard under very adverse circumstances. The *I.V.J.* lives to-day so that the profession could prosper and Science advance.

And now the hat is sent round so as to place this journalistic venture on a sounder and firmer basis. The *I.V.J.* is a priceless possession of our profession. It has placed the Indian Veterinary Surgeon, on the map of the scientific world. Just pause and ponder over, how much we owe to the *Journal* both individually and collectively. Is it too much then to expect the profession to respond to the appeal issued for a Reserve Fund? We hope not.

Some enquiries have come to us asking us to indicate the extent of help expected. We do not want to put the members of the profession to any undue financial strain in these hard days. At the same time, a certain amount of sacrifice is needed to make this fund a great success, so as to make it worthy of our profession. So we feel that the following scale of contribution will be quite reasonable. It could even be paid in two or three instalments.

Class I Officers	...	Rs. 100/- and above.
Class II Officers	...	Rs. 50/- and above.
All others	...	Rs. 25/- and above.

It is our ambition that no Veterinary Surgeon in this land should remain without contributing to this fund. Brick by brick, this great edifice of ours should begin to rise higher and higher. On the success or otherwise of this venture, the solidarity of our profession depends. "Pay and Prosper" is the slogan we pass on to the members of our profession.

Jai Hind!

T. VINAYAKA MUDALIAR,
Editor, *The Indian Veterinary Journal*.

THE I. V. J. RESERVE FUND

LIST OF CONTRIBUTORS

	Rs. nP.
Amount acknowledged (March 1962 issue) ...	7,551.55
Dr. M. R. Mahajan, Director, Animal Husbandry, U.P. ...	151.00
Mr. G. Sitaraman, Avanashi, Madras ...	5.00
Dr. M. R. Dhanda, Dean, College of Vet. Science, Pantnagar, 2nd inst. ...	200.00
Mr. K. Venugopal Rao, Pamilphad, A.P. 2nd instalment ...	10.00
Dr. R. N. Kohli, Vety. College, Bikaner, Rajasthan, 5th instalment ...	5.00
Total ...	7,922.55

Cheques, money orders and all correspondence should be addressed to the Editor, *The Indian Veterinary Journal*, Madras-17.

Kerala Veterinary Association

The Kerala Veterinary Association began its activities for the year 1962 with a general body meeting convened at the Kerala Veterinary College, Trichur. The general body adopted a new constitution for the Association, with provision for the formation of District Associations to function as district units of the state Association.

Dr. M. N. Menon, Director of Animal Husbandry, Kerala, has graciously accepted to be the Patron of the Association. The following office bearers were elected for the year.

<i>President :</i>	<i>Executive Committee Members :</i>
Dr. K. J. Simon, Trichur.	Dr. P. Rajagopalan, Kottayam.
<i>Secretary :</i>	Dr. R. Bhaskaran, Trivandrum.
Dr. R. Gopalakrishnan Nair, Trivandrum.	Dr. Achuthankutty, Cranganore.
<i>Joint Secretary :</i>	
Dr. A. M. Paul, Alleppey.	

Our first slogan was cent per cent membership for the Association. Within the first two months, District Associations were formed in all the districts and by the end of this month, the 100% membership campaign, will be completed successfully.

THE KERALA VET

The high light of this year's activities will be the publication of a quarterly bulletin — *The Kerala Vet.* — and the publication of a professional diary for free distribution to all members of the Association. The first issue of the bulletin will be published during April 1962.

Another important feature will be presentation and discussion of professional papers at district units and at the general body.

A sub-committee has been formed to gather all details regarding our service conditions and to prepare and submit a memorandum regarding the same to the Kerala Government.

Details regarding The Kerala Veterinary convention, which is proposed to be conducted during this year are yet to be finalised.

We are sure that the association will prove to be a vigilant and fully representative body of the veterinary profession in Kerala.

Trivandrum, }
16-3-62.

R. GOPALAKRISHNAN NAIR,
Secretary.

Review

Synopsis of Lectures in Veterinary Bacteriology:—By S. L. MANJREKAR, G.B.V.C., Assoc. I.D.R.I., Ph.D., Professor of Bacteriology, Nagpur Veterinary College, Nagpur, Maharashtra. First Edition 1962. Published by the author and priced at Rs. 22.50.

This is a new book by an Indian author, keen on helping the students to meet the requirements of an exhaustive syllabus which has been recently adopted in almost all the Veterinary Colleges in India. Being himself a teacher for a number of years in that particular subject, the author has virtually compiled his lecture notes into a book, so as to reach a wider circle. In doing so, it is evident that the work had to be got through in a hurry with the result that several errors in printing have crept in which could have been avoided with a little more care. That would have enhanced the value of the book.

The author himself admits he has "nothing new to give". He does not claim it to be a standard work on the subject, as is evident from the title given; but it is a fairly good maiden attempt for an Indian author. The coloured illustrations are good. Part VI of the book consists of several appendices on subjects like, collection, preservation and despatch of materials, post-mortem technique, vaccines and anti-sera, incubation and immunity of several infectious diseases, etc. and as such should serve as a useful guide to the field workers. The book must prove a good companion to the students.

NOTICE TO CONTRIBUTORS

1. THE INDIAN VETERINARY JOURNAL is intended for the publication of papers on Original work, General and Clinical articles, Abstracts, Reviews, Association News and other cognate matters pertaining to animal health and disease and the progress of Veterinary Science and the profession in general. The Editor, in his work of assessing papers received for publication, is assisted in an honorary capacity by a large number of Scientists working in various parts of India.
2. Papers are accepted for publication on the understanding that they have neither been published before nor are being considered for publication elsewhere.
3. Matter for publication should always be typed and sent in duplicate. The type-scripts should be on one side of the paper only with double spacing and one inch margin on the left side. They should be sent after careful revision and correction and without over-writings. Otherwise they are liable to be not considered.
4. Names of authors should be followed by their academic qualifications. Their official address or otherwise, should also be stated to enable correspondents to communicate with them direct if they so desire.
5. The papers must be concise and not unnecessarily elaborate. To achieve this object extensive summaries of all available literature with numerous references should be avoided, wherever possible. *The bulk of the paper should record the actual work done by the author or authors.* If papers submitted are considered to be of excessive length, they may be returned to the authors for necessary reduction and re-submission. Papers are accepted subject to the right of minor editorial revision, if considered necessary. No reasons will be given in cases of non-acceptance of articles.
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8. Drawings and diagrams should be in Indian Ink on stout white drawing paper or on Bristol board.
9. A small number of blocks illustrating articles are normally paid for by the Journal; but the authors may however be required to pay the entire cost of blocks if they are far too many for a single article. Half-tone photographs should be included only when they are found essential and they should be on glossy paper, bringing out the differences clearly.
10. The number and size of tables, charts and plates should be strictly restricted as the cost of publication is mounting up every day. Coloured plates will not be reproduced, except under exceptional circumstances or when the author is willing to bear the entire cost.
11. Publication of group photographs of some news-value to the profession and of individuals will be undertaken only if space permits and the cost of blocks in such cases will be thankfully received from parties concerned.
12. Abbreviations and mode of reference to Authors, years and journals should be on the model normally adopted in all international publications.

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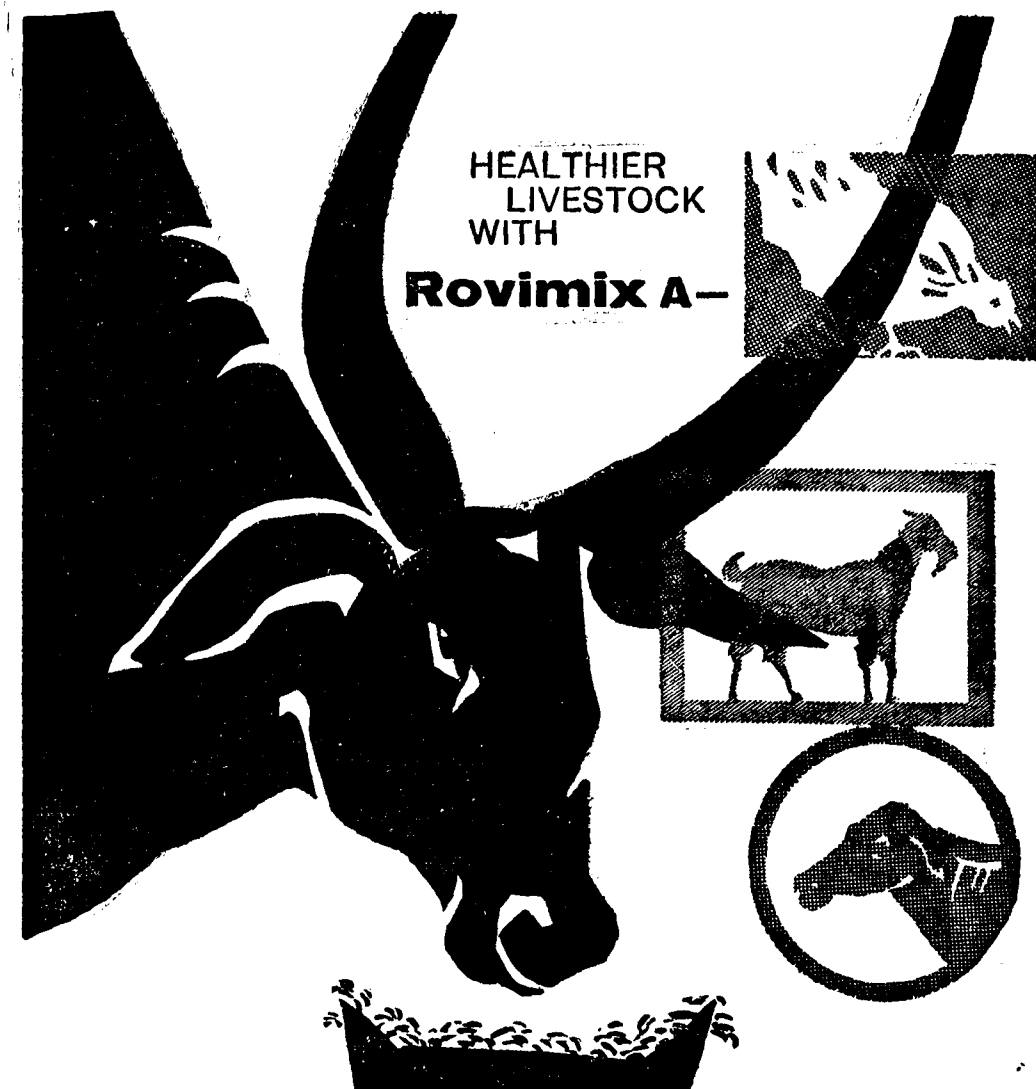
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INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Rafi Ahmed Kidwai Memorial Prizes for Agricultural Research

The Indian Council of Agricultural Research has, with a view to creating an incentive for research workers and to recognising outstanding research work done by them in the fields of agriculture, animal husbandry and allied subjects, instituted 11 prizes of the value of Rs. 5,000 each. These prizes are known as "The Rafi Ahmed Kidwai Memorial Prizes for Agricultural Research" and one prize will be awarded biennially i.e. once in two years for outstanding research work done in India in each of the following subjects:

- | | |
|-----------------------------|-------------------------------------|
| 1. Agronomy | 7. Animal Breeding |
| 2. Agricultural Engineering | 8. Animal Nutrition (including |
| 3. Agricultural Chemistry | Physiology and Biochemistry) |
| 4. Agricultural Botany | 9. Animal Diseases |
| 5. Agricultural Zoology | 10. Dairying, and |
| (including Fisheries) | 11. Agricultural & Animal Husbandry |
| 6. Horticulture | Economics & Statistics. |

2. These prizes will be in the form of gold medals or cash or both and one prize in each subject will be awarded on the basis of outstanding results of researches achieved by research workers in the country either individually or jointly, during the Calendar years 1960 & 1961, i.e. 1st January, 1960 to 31st December, 1961. Results achieved prior to the calendar year 1960 or after the calendar year 1961 will not be recognized for the purpose of the present award.

3. The award of each of the prizes shall be based on significant advances in human knowledge in a particular subject as revealed by books, monographs or papers published in the name of the candidate or any other unpublished account of the outstanding research work done or discoveries and inventions made by him. The selection of a candidate for the award of a prize will be made on the recommendations of a Judging Committee consisting of eminent scientists appointed for the purpose by the Indian Council of Agricultural Research. The award of a prize may be made to more than one research worker and the prize money divided amongst them in such proportion and manner as may be decided by the Council.

4. All research workers, engaged in research work in India, in the fields of agriculture, animal husbandry and allied sciences are eligible for competing for these prizes. Applications should be submitted in quadruplicate in the prescribed form, which can be had, free of cost, from the Secretary, Indian Council of Agricultural Research, Dr. Rajendra Prasad Road, New Delhi. Candidates working in Research Institutes etc., should submit their applications through the Head of the Institute/Department etc. Others may submit their applications direct.

5. All applications should be addressed to the Secretary, Indian Council of Agricultural Research, Dr. Rajendra Prasad Road, New Delhi, so as to reach him not later than the 31st May, 1962. The cover of applications should be superscribed as under.

"Application for the award of 'The Rafi Ahmed
Kidwai Memorial Prizes for Research in....."

Applications received after the 31st May 1962 will not be considered.

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Rules for the Award of Rao Bahadur R. Swaminatha Iyer Memorial Prize

(To Come into force from January 1962)

1. The award shall be called "Dr. R. Swaminatha Iyer Memorial Medal".
2. The award shall be made for the best clinical article appearing in the Indian Veterinary Journal in each year.
3. The cost of the award shall be met from the interest accruing on Rao Bahadur R. Swaminatha Iyer Memorial Fund.
4. Only those with a basic Veterinary qualification shall be eligible for the award.
5. Publications of clinical value, preferably of original nature, shall be eligible for consideration of the award.
6. In the case of joint authorship, the award shall be made by dividing the amount equally amongst the authors.
7. In the event of the award not materialising in any year for any reason the value of the award shall be added to the corpus of the fund.
8. The Managing Council of the Indian Veterinary Association shall appoint a Committee of three Judges - a Chairman and two Members - in December each year to determine the award. The General Secretary of the Association will act as Secretary to the Committee but he will have no voting power.
9. The majority decision of the Committee shall be final. In case all the three Judges differ, the final verdict will lie with the President of the Indian Veterinary Association.
10. The award will be announced in the April issue of the Indian Veterinary Journal each year.

J. Vinayaka Mudaliar,
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