

1947

Abstracts

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Recommended Citation

(1947) "Abstracts," *Iowa State University Veterinarian*: Vol. 9 : Iss. 2 , Article 12.

Available at: https://lib.dr.iastate.edu/iowastate_veterinarian/vol9/iss2/12

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ABSTRACTS



THE USE OF COAL-TAR DYES FOR SEMEN IDENTIFICATION. Experimental results suggest that coal-tar dyes can be used as an aid in the identification of bull semen samples without significant detrimental effect on the motility or fertility of spermatozoa.

Fifteen fresh semen samples diluted at the rate of 1 part of semen to 10 parts of egg-yolk buffer solution were colored with red, green, brown and purple F, D and C liquid colors, 1 drop of dye solution to 10 ml. of diluent. The samples were then cooled slowly to 40° F. and stored for a period of 10 days. At the onset of the trial period the semen possessed 68 per cent motile spermatozoa. At the end of these trial periods the average motility for the control samples was 23 per cent, while that for the colored samples varied from 21 to 24 per cent.

In field trials involving 2,995 inseminations in which an average of 59.9 cows were inseminated per semen sample there was no significant difference in the rates of conception in groups in which the control samples were used and those in which the colored samples were used.

Red and green color solutions gave the most effective color differentiation, and there was no evidence of fading during the 10-day periods.

[J. O. Almquist. *The Effect of Certain Coal-Tar Dyes Used For Semen Identification on the Livability and Fertility of Bovine Spermatozoa: Journ. Dairy Sci.*, 29:12, (Dec., 1946):815-20.]

CLOSTRIDIUM WELCHII, TYPE D, ANACULTURE IN THE CONTROL OF ENTEROTOXEMIA OF SHEEP. Studies indicate that the administration of *Clostridium welchii*, type D, anaculture to sheep produces a significant decrease in the loss from enterotoxemia.

In October, 1945, 2,010 sheep of a total number of 4,050 sheep on 13 farms were injected subcutaneously with 5 cc. of *Cl. welchii*, type D, anaculture. The total death rate among the sheep was 1.09 per cent as compared with the usual average loss of 4 to 5 per cent. The death rate was 0.55 per cent in the vaccinated animals and 1.62 per cent in the controls. There was evidence that a single injection with anaculture gives an adequate protection throughout the winter.

Sections of the intestine were examined for the presence of the toxin in the ingesta. The toxin was demonstrated in 2 of 11 deaths in the vaccinated groups, and in 21 of 33 deaths in the controls.

[D. W. P. Bythell and W. H. Parker. *The Control of Enterotoxemia in Fattening Sheep by a Single Inoculation with Clostridium Welchii, Type D, Anaculture: Vet. Rec.*, 58:33, (Aug. 17, 1946):367-8.]

ALUM PRECIPITATED TOXOID IN THE CONTROL OF ENTEROTOXEMIA IN LAMBS. Observations show that the subcutaneous injection of 5 cc. of an alum precipitated toxoid of *Clostridium perfringens*, type D, into 5-month-old lambs produced a higher anti-toxic blood titre than the usual 5 cc. dose

of antiserum and reduced the death losses due to enterotoxemia.

One-half of 2,273 lambs on 7 ranches that had previously suffered losses due to enterotoxemia up to 25 per cent were injected with a single 5 cc. dose of the alum precipitated toxoid, and one-half were left untreated as controls. The death loss in the treated lambs was 0.02 per cent as compared to 0.15 per cent in the controls. On one ranch, however, the loss was only 0.61 per cent in 164 treated lambs in contrast to a loss of 8.09 per cent in 136 untreated lambs. In 2 field trials one ranch experienced no losses in either the treated or the untreated animals, while on the other ranch the loss among 150 lambs injected with 5 cc. of the alum precipitated toxoid was 1.33 per cent and 9 per cent in the controls (121 lambs) in the first 35 days following vaccination. At this time the remaining untreated animals were vaccinated, and no further losses were experienced.

It was noted that it required 14 days after injection for the lambs to develop their maximum antitoxic blood titre.

[O. H. Muth and Don Rex Morrill. *Control of Enterotoxemia (Pulpy Kidney Disease) in Lambs: Am. Journ. Vet. Res., 7:24, (July, 1946):355-57.*]

CLINICAL OBSERVATIONS ON THE USE OF BENADRYL. Clinical observations on benadryl, a comparatively new antihistaminic compound, indicates that in humans the drug is effective in decreasing the vasodilating action of histamine, the alleviation of histamine-induced nasal congestion, the decrease of gastric response to histamine, the reduction of allergy to cold, in reducing allergic edemas and in relieving the symptoms of Meniere's disease. When administered by the oral, intramuscular, or intravenous routes there is not sufficient undesired side effects to warrant discontinuation of therapy.

Benadryl was found to be 15 to 30 times more effective than aminophylline and 650 times as effective as papaverine in relieving histamine-induced bronchial spasms. The intravenous injection of benadryl in conjunction with a 1:250,000

solution of histamine reduced cutaneous hyperemia inaugurated by histamine. In hay fever victims the drug depressed nasal congestion. In 19 analyses of gastric content from patients receiving benadryl the gastric acids of 2 persons did not respond to histamine, those of 3 persons exhibited a definite rise in quantity and the response in 4 was blocked by benadryl. Previous observations suggested a rise in the hydrochloric acid curve of 20 units when benadryl was administered in conjunction with histamine as compared to 30 units when histamine was injected alone. When benadryl was given intravenously for 10 minutes, the cutaneous wheal in response to ice applied to a patient with a cold allergy was reduced to about 50 per cent the usual size.

Therapeutically the drug was used in doses of 50 to 500 mg. per day orally, 20 mg. per injection intramuscularly and 10 to 120 mg. per 10-minute period intravenously as a solution containing 60 mg. of benadryl per 100 cc. normal saline solution.

In hay fever cases 21 of 22 patients obtained at least 50 per cent relief and in 19 of the 22 cases, 75 per cent or more relief was observed. Three cases of Meniere's disease received relief after administration of the drug. Urticaria and pruritus following penicillin therapy disappeared in 28 minutes after administration of benadryl. Similar response was noted in a case of barbiturate allergy.

Four consistent side effects were noticed: sleepiness, dizziness, dryness of the mouth and nervousness. There were no abnormal features in blood pictures or urinalyses following the use of benadryl.

[T. W. McElin and Bayard T. Horton. *Clinical Observations on the Use of Benadryl: A New Antihistamine Substance: Proc. of the Staff Meetings of the Mayo Clinic, 20:23, (Nov. 24, 1945):417-29.*]

A VIRUS CAUSING ABNORMAL MILK IN CATTLE. Laboratory studies suggest that a condition found in dairy cattle of New Jersey, and characterized by bloody, thickened milk and a

body temperature of 104° F. may be produced by a virus.

Four to 7 days after parenteral inoculation with 1 to 5 cc. of freshly drawn milk from affected cows; guinea pigs and rabbits responded with a temperature rise closely simulating that found in cattle. This elevation of temperature persisted for 3 days. Experimental animals killed during the febrile stage of the disease showed hemorrhages in the lungs, focal necrosis of the liver and slightly enlarged mesenteric lymph nodes. Following recovery from a case of the disease, animals showed no response to subsequent inoculations.

Although mice showed no evidence of infection, tests indicated that the agent was present after serial passages.

One of 2 lactating cows inoculated subcutaneously with 1 cc. of blood from a first guinea pig transfer exhibited fever after 7 days, and the other on the ninth day. However, neither of these cases exhibited red blood cells in the milk. The agent was demonstrated in the blood stream of both cows.

Sera of animals that had recovered from experimental or natural infection neutralized 100 to 1,000 infectious doses for guinea pigs. No bacteria could be demonstrated from the yolk sac membrane or the blood of affected animals upon inoculation of culture media or microscopic examination using the methylene blue stain, so it is assumed that the causative agent is a virus.

[James A. Baker and Ralph B. Little. *A Virus Causing Abnormal Milk in Cattle: Proc. Soc. Expt. Biol. and Med.*, 63:2, (November, 1946):406-7.]

VAGINAL ABSORPTION OF PENICILLIN. These studies suggest that penicillin is absorbed through the vaginal mucosa in nonpregnant and post-parturient females. This absorption is in sufficient amounts to maintain a penicillin blood level of adequate concentrations to combat streptococci and staphylococci for a period of 3 to 4 hours from the time of inserting a vaginal suppository containing 100,000 units of penicillin.

Nine nonpregnant women with vaginitis or chronic cervicitis with a profuse discharge were treated with vaginal suppositories of 100,000 units of penicillin in a cocoa-butter base. The serum levels of penicillin after ½ hour averaged .68 of a unit of penicillin per cc., after 1 hour .655 of a unit, .068 unit after 3 hours and .039 of a unit after 6 hours. Of 3 patients within 2 weeks of term, 2 showed no absorption of penicillin and 1 showed levels of .156, .039, .018 of a unit of penicillin per cc. for the above periods. In one case of a woman 2¾ months short of term the levels were similar to those of the nonpregnant women.

In 4 patients 10 days post partum the penicillin concentrations were high: at ½ hour there was an average of .938 of a unit; at 1 hour an average of .781 of a unit and at 4 hours an average of .063 of a unit per cc. of blood. One patient 9 days post partum had no concentration in the blood after ½ hour and only .019 of a unit at 1 and 4 hours. Two patients, respectively 14 and 35 days post partum, showed moderate levels of penicillin in the blood stream.

[John Rock, Robert H. Barker, and W. Benjamin Bacon. *Vaginal Absorption of Penicillin: Sci.*, 105:2714, (Jan. 3, 1947): 13.]

THE USE OF CURARE IN ANESTHESIA. In human medicine curare is used advantageously in conjunction with general anesthetics to obtain more complete muscular relaxation without the usual dangers associated with deep surgical anesthesia.

With the aid of tracheotomy and artificial respiration curare has been used successfully to control seizures of tetanus. Curare is thought to exert its effect peripherally at the neuromuscular junctions. This action is inhibited by prostigmine. The muscles are affected in the following order: first, those supplied by the cranial nerves, then those of the trunk and extremities and finally those of respiration, the diaphragm being the last muscle affected. The incidence of laryngospasm is reduced when curare is

used. The drug is less effective when used without anesthesia or preanesthetic medication.

Respiratory depression appears to be the only undesirable effect of the drug, and consequently it should not be used unless one is equipped to give artificial respiration. Ether, pentothal and trimethanol also possess some curariform action, so care must be exercised in administering the drug in conjunction with these agents.

In these trials the dosages of curare were based on the patients age, vigor, weight and rate and depth of respiration. Based on weight alone $\frac{1}{2}$ to $\frac{2}{3}$ mg. per pound was used.

In 100 cases curare was used in 1 to 4 doses during an operation. The drug is excreted rapidly in the urine, so additional doses were administered upon the surgeon's request. In 92 of the 100 cases relaxation was classed as being excellent, in 6 cases it was fair and in 2 it was poor. There was no noticeable effect on respiration in 64 of the cases, mild depression in 24 cases, severe depression in 8 cases and actual apnea in 2 cases. There were no deaths attributable to curare, and no harmful after effects.

There appears to be no increase in the tolerance to the drug through repeated use.

[Frank Cole. *The use of Curare in Anesthesia, Review of 100 Cases: Anes. 6, (Jan., 1945):48-56.*]

DISEASE IN CATTLE ASSOCIATED WITH LEPTOSPIROSIS. This paper describes outbreaks in 3 herds of cattle in Texas counties with symptoms resembling those of leptospirosis in dogs. On one ranch sporadic losses began in June, 1942, and continued until October of the same year. The incidence of the disease reached a peak during the last part of September when about 40 per cent of 1,700 animals showed symptoms. Starting in September and lasting well into December there was a storm of abortions. Because of this a 63 per cent calf crop was branded that spring as compared to a 90 per cent crop the preceding year. Similar condi-

tions were found in the other 2 herds at about the same time. In 1944 and 1945 minor outbreaks of this disease were experienced on 5 additional ranches.

The disease was characterized by temperatures ranging from 104° F. to 107° F. and a nasal discharge which was first a thin mucus and later mucopurulent. This discharge spread over the muzzle, which in turn became dry and scaly. During the period of high temperatures the animals showed rapid respiration, partial loss of appetite and sometimes diarrhea. From this condition there was a rapid change to recovery, or to one of 3 recognized forms of the disease. In the mildest form the high temperature persisted for 24 to 36 hours and was associated with diarrhea lasting 1 to 6 days, poor appetite and a marked loss of weight. This form occurred in about 75 per cent of the cases. The acute fatal form was characterized by hemoglobinuria with fatal termination in 48 to 72 hours. Between these 2 forms there was a chronic form which in some cases showed a transitory hemoglobinuria. In this form the early diarrhea remained a prominent symptom for weeks or until death. The termination of the diarrhea was frequently marked by constipation with large amounts of mucus being expelled with the inspissated feces. There was temporary loss of appetite, which was quickly regained; but in spite of adequate ingestion of feed the animal gradually became emaciated. In many cases the muzzle was encrusted with a brownish-black scab, which sloughed off to leave a red surface that soon changed to a light tan color. In some cases there was a yellow discoloration of the hair and skin in the lighter areas. Abortion accompanied the mild forms of the disease.

In the acute fatal form there was a characteristic greenish-yellow color of the body fat. The liver, when first removed possessed a faint yellow color, but rapidly changed to an orange color after exposure to the air and light. The kidneys varied in color from normal to a light mahogany, and the cortices contained petechiae-like areas, which upon microscopic examina-

tion were found to be hemoglobin casts. Numerous small hemorrhages and ulcerations were found on the abomasal mucosa.

In the chronic form the serous surfaces between the ribs, the anterior and posterior surfaces of the diaphragm, the surface of the spleen, and sometimes the mesentery were covered with tiny granulations that had the character of organized hemorrhages. The kidneys were enlarged, gray to light brown, and possessed numerous gray foci in the cortices. The liver was lighter brown in color than normal, and the accompanying lymph nodes were edematous and slate-colored. The abomasal mucosa was dotted with ulcerations and scars of healed ulcers.

Microscopically, the liver showed focal central necrosis. The kidneys showed extensive albuminous degeneration, simple necrosis, pigmentation of epithelium and numerous hemoglobin albuminous casts. In the tubules and Bowman's capsules there were numerous, small, spherical to oval bodies ranging in size from .5 to 5 microns in diameter and varying in number from 1 to 30 per cell. These bodies stained light pink with eosin, but were not detected with ordinary hemotoxylin and eosin stain. The spleen showed congestion and hemosiderosis.

Chronic Form

In the chronic form the lesions in the kidneys varied from advanced parenchymatous and beginning interstitial nephritis in cases 2 and 3 weeks old, to marked thickening of the basement membrane of Bowman's capsule and definite connective tissue infiltration of both the cortex and medulla in cases of 2 months standing. Many of the tubules were distended with wandering leucocytes, predominately polymorphonuclears. Casts of hyaline material and cellular debris were detected in many of the tubules. As in the acute form, extensive pigment deposits were found. Oval bodies similar to those found in the acute form but larger and fewer in number were found here. The usual picture of the liver was a moderate albuminous and slight fatty change. The spleen

showed marked hemosiderosis and lymphoid exhaustion. In 2 cases there was necrosis of the capsules and trabeculae, with calcium deposits in the necrotic areas. The lymph nodes were edematous and showed lymphoid exhaustion with some hemosiderosis. The mucosa of the small intestine was thickened as a result of lymphoid hyperplasia. In some cases the myocardium showed interstitial edema. The abomasal mucosa was covered with ulcerations and areas of active regeneration.

Hematology

Analysis of the blood of 2 animals revealed erythrocyte counts of 6.5 and 9.5 million per cubic millimeter of blood, and leucocytic counts of 12,900 and 12,200 cells per cubic millimeter, respectively. Five weeks later the erythrocyte counts were respectively 4.8 and 4.3 million and the leucocytic counts 16,000 and 23,000 cells per cubic millimeter. The average leucocytic ratio for the 2 animals was: polymorphonuclears, 17; lymphocytes, 61; mononuclears, 9; eosinophils, 1; and megaloblasts, 12.

The animals seemed to build up an immunity to the disease upon direct exposure. Consequently, it was necessary to import into the herd 20 animals for experimental inoculation. Seven of these animals developed characteristic symptoms of the disease after inoculation with subcutaneous injections of an emulsion of infected liver, kidney and spleen.

Agglutination tests using the rapid plate method with *Leptospira icterohemorrhagicae* and *Leptospira canicola* were negative.

It was possible to demonstrate leptospira-like organisms in some of the tissues after widespread search. However, these organisms failed to show a definite spiral shape, and none exhibited the characteristic little hook on the end.

Uncontrolled treatment trials suggest that sulfanilamide may be helpful in correcting the condition.

[Mathews, Frank P.: *A contagious Disease of Cattle Associated with Leptospira*. *Am. J. Vet. Res.*, 7, (1946):78-83.]

POTASSIUM DEFICIENCY IN THE DOG. When dogs are fed a ration which is deficient in potassium, they fail to grow and tend to develop a paralysis which is curable only with potassium therapy.

An experiment was set up in which 6 dogs were fed a potassium deficient, but otherwise complete ration. All animals showed poor growth, and a plateau in the growth curves was soon evident. The dogs became restless and symptoms of potassium deficiency arose after a few weeks. At this time 2 of the dogs were given a single dose of 3 gr. potassium chloride by capsule, and the salt mixture given these 2 dogs was changed to include 160 gr. of KCl per 1,000 gr. of salt mixture. An immediate growth response occurred which continued for 30 to 40 days.

The remaining 4 animals were fed the experimental ration until 1 of the animals developed a moderate attack of paralysis during the seventh week of the experiment. The paralysis first started in the muscles of the neck and the animal was unable to hold its head erect. This animal was also given 3 gr. of potassium chloride by capsule and placed on a potassium supplemented ration. The dog showed a marked growth response and paralytic symptoms disappeared.

Two days later another dog developed neck paralysis that grew progressively worse until the animal was severely paralyzed. The rear legs were completely paralyzed and the front legs were too weak to enable the dog to raise itself from the bottom of the cage. Again 3 gr. of KCl by capsule was given the dog and an hour later the animal was able to stand and walk around. The other 2 dogs both exhibited paralysis and both responded to potassium therapy. As the experiment progressed, and before potassium supplements were given, the teeth of all the dogs became discolored and the enamel appeared to be eroded. With potassium therapy, the condition improved, but recovery was not complete.

It is believed that the paralysis might be explained on the basis of a breakdown in certain enzyme systems. Potassium

seems to be concerned with *in vivo* enzyme systems responsible for phosphorylation. It has been shown that potassium markedly accelerates the transfer of phosphate to creatine in homogenized fresh muscle. Thus, the paralysis may be due to a breakdown in the enzyme system responsible for muscle contraction.

Several dog breeders and veterinarians have found the frequent existence of a paralysis in animals maintained on commercial dog foods. The possibility of a potassium deficiency existing in those rations should be investigated.

[W. R. Ruegamer, C. A. Elvehjen, and E. B. Hart. *Potassium Deficiency in the Dog: Soc. Expt. Med. & Biol.*, 61:2, (Feb., 1946):234-38]

NEW SMALL ANIMAL SURVEY

A recent survey indicates that America's dog population is much larger than has heretofore been believed.

A projection of data secured from a representative cross-section of 2759 American families points to a dog population nearer 20,000,000 instead of the 15 million figure accepted until very recently by most dog authorities.

The survey also brought out a number of other interesting facts: The South leads in the number of dog-owning families, with 53 per cent of the homes below the Mason and Dixon line having one or more dogs. In the southern states, too, the average per family numbers 1.6 dogs as compared with the national average of 1.4 dogs.

Dog ownership varies in inverse proportion to the size of communities. Farmers have a higher percentage of dog ownership than any other population group.

Dog ownership is only slightly higher among families with children than in those without children. Approximately half of all families with children boast dogs, while 40 per cent of all families without children keep canine pets.