

Problem Solving and Self-Evaluation for Dairy Practitioners

The following self-evaluation program was prepared by: Faculty, Department of Large Animal Veterinary Clinical Sciences, University of Minnesota. Drs. John F. Anderson, Ralph J. Farnsworth, James O. Hanson, Chairman, Thomas T. Herdt, Donald W. Johnson, William Olson, Ashley Robinson, Howard L. Whitmore, Jerome Vestweber, and the following private practitioners: Drs. Carlos H. Contag, New Ulm, MN; Kenneth F. Detlefson, Red Wing, MN; Charles D. Gibson, Elbow Lake, MN; Roger W. Meads, Hortonville, WI; and presented by: Drs. James O. Hanson, Thomas J. Herdt, William Olson, Howard L. Whitmore, and Jerome Vestweber at the Annual Conference, AABP, San Francisco, California, Dec. 8, 1976. Copyrights applied for.

Part I. Dairy Reproduction Dr. Howard L. Whitmore, Chairman

- The owner of the top cow in your state wants you to inseminate his cow. He only has one ampule of semen (valued at \$1,500). What would you recommend?
 - Palpate for follicle every 8 hours and predict when to A.I.
 - Palpate for follicle, inject HCG and A.I.
 - A.I. on basis of standing heat (middle or last half).
 - Split the ampule of semen and A.I. twice during standing heat.
- When doing postpartum uterine palpations, it is helpful to know the exact date of calving. When following calving should all of the lochia normally be expelled from the uterus?
 - 2 days.
 - 5 days.
 - 15 days.
 - 25 days.
 - 35 days.
- With the development of milk and serum progesterone tests, it is easy to document when cows first ovulate and form CLs following calving. Recent reports show that most cows first ovulate:
 - 5-10 days after calving.
 - 15-20 days after calving.
 - 25-30 days after calving.
 - 35-40 days after calving.
- How would you induce abortion in 10 heifers pregnant about three months?
 - Inject 10 mg ECP.
 - Inject 20 mg ECP.
 - Infuse 500 cc saline in uterus.
 - Infuse 200 cc dilute lugols in uterus.
- Which of the following treatments would you recommend for cystic ovaries in dairy cattle?
 - 1,000 units HCG in vein.
 - 5,000 units HCG in vein.
 - 2,500 units HCG in muscle.
 - 10,000 units HCG in muscle.
 - 2,500 units HCG in muscle, plus manual rupture.
- You have just treated a cow for cystic ovaries. The owner wants to know when to expect the cow to straighten out and come into heat. What would you tell him?
 - 0-5 days.
 - 5-15 days.
 - 15-30 days.
 - 30-45 days.
- Testosterone treated cows and steers are being used in place of "marker" bulls for heat detection. What doses of testosterone are being used?
 - 350-500 mg repository testosterone every 4 weeks.
 - 500-1000 mg testosterone enanthate every 2-4 weeks.
 - Dose not accurately determined at present time.
 - All of the above.
- In your dairy practice, you do a lot of postpartum uterine exams. You are finding a lot of cases of cystic ovaries in cows 20 to 40 days after calving. Which of the following alternatives may be the best way to treat "early" cysts?
 - Rupture the cyst and check next time.
 - Don't do anything-check next time.
 - Treat all cases with HCG.
 - Nobody knows for sure.
- When should cows be inseminated in order to achieve maximum pregnancy rates?
 - First half of estrus.
 - Middle or last half of estrus.
 - Twelve hours after estrus.
 - 24 hours after estrus.
- What should the "normal" first service calving rate be for either a bull or A.I.?
 - 40-55%.
 - 55-70%.
 - 70-85%.
 - 85-100%.
- Recent field surveys show first service calving rates from A.I. are lower than expected. What do you think the actual first service calving rate for A.I. is at the present time?
 - 25-40%.
 - 40-55%.
 - 55-70%.
 - 70-85%.
- Which of the following hormones would you inject to "repeat breeder" cows at the time of third insemination to hopefully improve the pregnancy rate?
 - Progesterone.
 - Estradiol.
 - Duoval (testosterone and estradiol).
 - Human Chorionic Gonadotropin.
 - None of the above.
- Why do many herds having severe repeat-breeder problems conceive so quickly when the owner switches from A.I. to natural service?
 - Disease problem finally cured itself.
 - Nutrition problem finally straightened out.
 - Bull breeds cows on basis of primary heat signs (standing). Herd manager may be calling the A.I. technician on basis of both primary and secondary heat signs (non-standing).
 - Conception is normally higher for a bull than for A.I.
- Which of the following would you say is the single most common cause of repeat-breeders when dairymen are using A.I.?
 - Nutrition.
 - Management.
 - High milk production.
 - Disease.
- The A.I. technician should be called when cows are seen *standing firm* while being mounted by another cow. Some dairymen call A.I. technicians by which of the following secondary signs?
 - Mounting other cows.
 - Swollen vulva and mucus discharge.
 - Hyperactivity and bellowing.
 - All of the above.
- Client requests you to infuse the uterus of all his cows. What would you do?
 - Punt-question's okay but answer not completely known.
 - Infuse most cows with a product that won't require discarding the milk.
 - Infuse most cows with antibiotics to see if it will work.
 - Try a bull for awhile.
 - Check out A.I. timing and technique.

17. When performing early pregnancy diagnosis (35 days) it is helpful to:

- a. Start by locating the cervix and retract the cervix and uterus.
- b. Locate the CL in the ovary to determine the side of pregnancy.
- c. Examine for asymmetry and thinning of the uterine wall.
- d. Examine for a membrane slip (connective tissue card) at base of horn near the *attached* border.
- e. All of the above.

18. A new herdsman inseminator is having a very low first-service conception rate. He claims his technique is okay and that cows are inseminated only during *standing* heat. He thinks there is something wrong with the semen or the cows. What would you do?

- a. Check out the semen.
- b. Check out the cows.
- c. Check out A.I. technique.
- d. Try a full-time A.I. technician again.
- e. Try a bull for awhile.

Part II. Nutrition and Metabolic Diseases

Dr. William Olson, Chairman

1. When looking at various herd problems (i.e., milk fever, ketosis, footrot, etc.) from a nutritional point of view, the following ball park figures for the given dietary ingredient should be met:

- a. Mineral content of the grain ration equivalent to Dicalcium Phosphate should be added at the rate of: 1. .5%; 2. 1.0%; 3. 1.5%; 4. 5.0%; 5. 10.0%.

2. Vitamins A and D should be added to the dairy ration at the following unit rate/day/animal:

- a. 10,000 + 5,000.
- b. 50,000 + 25,000.
- c. 100,000 + 200,000.
- d. 1,000,000 + 500,000.
- e. 200,000 + 100,000.

3. The daily gram intake of phosphorus for a dairy cow producing 70 lbs. of milk should be:

- a. 200 gm.
- b. 35 gm.
- c. 50 gm.
- d. 100 gm.
- e. 150 gm.

4. The % moisture of the kernel at harvest to insure the best preservation of ground high moisture ear corn is:

- a. 13-19%.
- b. 20-26%.
- c. 27-33%.
- d. 34-40%.
- e. > 40%.

5. One of your clients has had 10 D.A.'s occur in the last 30 calvings. List the factors of most concern:

- a. Mineral content of alfalfa.
- b. Vitamin C content of the ration.
- c. Length of cut of haylage.
- d. Prepartum feeding and housing.
- e. Mouldy feed.
- f. Feeding regime postpartum.

6. The ideal % moisture and theoretical length of cut for low moisture hay silage is:

- a. 30% moisture and 1/4" cut (with a screen).
- b. 50% moisture and 1/2" cut.
- c. 55% moisture and 1/4" cut.
- d. 60% moisture and 1/4" cut (with a screen).

7. What is the % protein on a dry matter basis required in the total daily food intake of a cow producing 70 lbs. of milk:

- a. 8%.
- b. 10%.
- c. 12%.
- d. 16%.
- e. 25%.

8. What is the average dry matter intake of a 1400 lb. cow producing 60 lbs. of milk:

- a. 10-20 lbs.

- b. 20-30 lbs.
- c. 30-40 lbs.
- d. 40-50 lbs.
- e. > 50 lbs.

9. Consistent laboratory findings in selenium and Vitamin E deficient animals are:

- a. SGOT decreased.
- b. Serum Ca increased.
- c. SGOT increased.
- d. CPK increased.
- e. Urinary creatinine decreased.

10. In obstruction of abomasum and intestine of cattle the major electrolytes lost are:

- a. Cl
- b. Na
- c. HCO₃
- d. K
- e. Mg.

11. You are called to retreat a milk fever cow 24 hours after the first treatment (still down). Cow is eating, drinking, and defecating. What approach should you follow?

- a. Give Ca to effect 150-1000 ml.
- b. Give a thorough physical exam.
- c. Determine serum Ca.
- d. Determine serum enzymes.
- e. Routinely recommend clients recall in 6-8 hours after first treatment.

12. Your client has a 30% incidence of primary ketosis. Which of the following may be contributing to the problem:

- a. High level of grain to lactating animals.
- b. 80% moisture hay silage.
- c. Feeding 4 lbs. of grain/day to dry cows and then just prior to calving increasing grain slowly to reach maximum intake 2-4 weeks postpartum.
- d. Lead feeding to free choice grain prior to calving resulting in indigestion.
- e. Feeding poor quality hay and 10 lbs. of grain to cows with a high potential for milk production.

13. The following statements concerning primary bovine ketosis are true:

- a. Temp. 98-104° F.
- b. Near normal G.I. motility.
- c. Some dehydration.
- d. 5 mo. postpartum.
- e. Behavioral changes are usually observed.

14. After administering 200 ml of calcium preparation to a milk fever cow, the heart stops and head slumps to ground. What should you do?

- a. Increase rate of Ca administration.
- b. Give MgSO₄ to effect.
- c. Give atropine IM.
- d. Give 1-3 ml epinephrine IV.
- e. Discontinue administration and initiate resuscitatory measures as indicated.

Part III. Management and Control of Mastitis

Dr. Ralph J. Farnsworth and Thomas H. Herdt,

Co-chairmen

1. A dairyman comes to you with a problem. He has been informed by the dairy plant that he has a high bacteria count. What is the *most* likely cause of his problem?

- a. High incidence of mastitis in the herd.
- b. Failure to discard abnormal milk.
- c. Poor milking practices and cooling of milk.
- d. Presence of cryophilic bacteria.

2. High bacteria counts are usually associated with udder infections involving which organism(s)?

- a. Staph aureus.
- b. Corynebacterium bovis.
- c. Strep agalactia.
- d. Pseudomonas.

3. Rumen atony early in the course of an acute mastitis case is usually associated with the following causative organisms:

- a. Staph.
- b. Strep ag.
- c. Strep ub.
- d. E. Coli.
- e. *Corynebacterium pyogenes*.

4. A dairyman had been "shut off" because the somatic cell count of his milk is over 1-1/2 million. What can he do to reduce the cell count of his mastitis milk most rapidly:

- a. Treat all cows intramammary with antibiotics.
- b. Use CMT to select cows and treat all positive quarters.
- c. Bring milking equipment up to standard.
- d. Run CMT and discard the milk from the 10% of cows with the highest reaction.

5. Mastitis caused by yeast is most often associated with:

- a. Excessive doses of antibiotics.
- b. Silage feeding.
- c. The prolonged use of intramammary antibiotics.
- d. The use of "homemade" and multiple dose vials of antibiotic preparations.

6. The most effective and practical treatment for yeast mastitis is:

- a. Intramammary Mycostatins.
- b. Feed organic iodides.
- c. Tylosin IM.
- d. Do not treat.

7. There is reasonable evidence to indicate that whey antibody is an effective mastitis treatment when antibodies specific for the pathogen are used.

True or False

8. If properly collected, bacteria can be isolated from nearly all cases of clinical mastitis which have a bacterial cause.

True or False

9. Most tests used to evaluate mastitis in the dairy cow involve either some measurement of somatic cells or bacteria. Which of these two types of tests is most useful in assessing intramammary infection:

- a. Bacteriological.
- b. Somatic cell.

10. In herds with extremely poor sanitation it is not uncommon to find two or more organisms infecting the same quarter.

True or False

11. Since nearly all mammary infection enters through the teat canal and any organism found inside the udder may be considered as an infection, the best way to take a milk sample is to thoroughly cleanse the teat end and culture the very first milk stripped out.

True or False

12. Which diagnostic methods can be easily employed to assist in the differential diagnosis of coliform mastitis?

- a. Auscultate the rumen—it is atonic.
- b. Stain slide (blood) with new methylene blue.
- c. Stain mastitic milk.
- d. Culture and sensitivity.
- e. All of the above.

13. You are faced with a high incidence of self-inflicted teat trauma in a herd. Housing and stall size are adequate. You have had an effective herd health program in this herd for several years. As a result he has been able to retain high producers and has several older cows. What would you suggest to alleviate some of the trauma?

- a. Trim dew claws.
- b. Surgically remove medial dew claws.
- c. Tour the yards and facilities—observe for potential injury sites.
- d. All of the above.
- e. Advise use of dew claw protections.

14. First calf heifers in a large herd are calving with mastitis. You culture *Strep agalactiae*; what is the route of entry into the udder?

- a. Sucking calves housed in groups; fed milk from mastitic cows that had been treated.
- b. The milking machine.
- c. The milkers.
- d. All of the above.

15. Postpartum uterine exams reveal a thick-walled "meaty" uterus in many animals in a large group of cows all of which you have treated with a diuretic. What aspects should you consider in re-evaluating the treatment of udder edema with a diuretic?

- a. Advisability of using diuretics that contain steroids.
- b. Treat for a longer period of time.
- c. Treat for a shorter period of time.
- d. Discontinue present treatment.
- e. None of the above.

16. It is always tempting to mix your own "potion" for mastitis treatment. You feel it is so successful you start dispensing this preparation for general use. What responsibilities to yourself or to others do you face as a result?

- a. FDA - regulations.
- b. Proof of efficacy.
- c. Advise owner of proper milk withholding time.
- d. Presence of tissue residues.
- e. All of the above.

Part IV. Dairy Calf Health Drs. Jerome Vestweber and Thomas H. Herdt, Co-chairmen

1. The hemogram of a calf with an E. coli septicemia would normally reveal the following:

- a. Significantly decreased white blood cell count.
- b. Significantly decreased packed cell volume.
- c. Significantly decreased total serum plasma proteins.
- d. Significantly decreased red blood cell count.

2. A group of 15 housed dairy calves, two months of age, were released to a small weedy pasture which contains a pond as the water source. Two days later four calves are exhibiting lameness, two are unable to stand, and one calf was found dead. Which of the following diseases should be considered:

- a. Nitrate toxicity.
- b. Vitamin D deficiency.
- c. White muscle disease.
- d. Organophosphate toxicity.
- e. *Clostridium chauvei* infection.

3. Laboratory results from the 15 housed dairy calves turned on pasture as reported in the previous slide revealed the following:

1. Laboratory results: (a) CPK - 1000 I.U.; (b) SGOT - 500 S.F.U.; (c) Cholinesterase levels - normal; (d) Nitrates: pond water - 25 ppm; alfalfa hay - 500 ppm.
2. Mineral and vitamin supplementation: (a) Vitamin D - 200 I.U./day; (b) Ca/P - 10 gm/7 gm/day.

3. Fresh postmortem of dead calf: (a) Marked degeneration of heart muscle and muscles of pelvic girdle; (b) Histopath of pelvic muscles - negative to box car type organisms.

Based on the above, what is the most probable diagnosis?

- a. Nitrate toxicity.
- b. Vitamin D deficiency.
- c. Organophosphate toxicity.
- d. White muscle disease.
- e. *Clostridium chauvei* infection.

4. Based on the nutrient requirements of the newborn calf, a milk replacer for calves under 30 days of age should ideally contain the following ingredients:

- a. Crude fiber content of 0.5% or less.
- b. Protein content of at least 24-28%.
- c. Fat levels approximately 10-20%.
- d. Carbohydrate from such sources as oatmeal or corn flour.

5. Calves infected with bovine virus diarrhea in utero may result in which of the following circumstances:

- a. Abortion.
- b. Live calf born with cerebellar hypoplasia.
- c. Birth of a weak calf.

- d. Inapparent infection at birth.
e. All of the above.
6. Several factors contribute to the development of metabolic acidosis in diarrhea of calves. Which of the following statements is correct:
a. A major cause is intestinal HCO_3 loss.
b. A major cause is sequestering of HCL in the small intestine.
c. Excessive loss of H^+ ions through the kidneys.
d. Peripheral vasoconstriction results in oxygen deficiency to the tissues, and anerobic metabolism.
7. The diagnosis of reo and corona virus diarrhea problems in calves requires submission of different samples for identification in the laboratory. Which of the following are correct:
a. Corona virus is most easily diagnosed by fluorescent antibody testing of fecal samples directly.
b. Reo virus is most easily diagnosed by fluorescent antibody testing a fecal sample taken from a calf during the first 6 hours of diarrhea.
c. Freezing of fecal specimens is detrimental to the fluorescent antibody test for reo virus.
d. A section from the spiral colon is the specimen of choice for the diagnosis of corona virus.
8. The most common respiratory disease of dairy calves up to three months of age is enzootic pneumonia. The following are correct:
a. A recognized problem with the disease is failure of early recognition.
b. Pasteurella spp. are one of the etiological agents involved.
c. Poor ventilation, high humidity, high levels of ammonia and marked variation in barn temperature complicate the etiological picture.
d. Chlamydia spp. are one of the etiological agents involved.
e. All of the above.
9. When initially called to investigate the cause of a continuing herd problem of colibacillosis involving rapid deaths of two- to five-day-old calves, the most useful of the following laboratory tests would be:
a. Zinc sulfate turbidity.
b. CBC.
c. Culture and sensitivity.
d. E. coli serotype.
e. Serum electrolytes.
10. In this herd you suspect that the calves are dying of coli septicemia. To isolate the offending organism from a recently dead calf the best tissue to culture is:
a. Upper small intestine.
b. Liver and spleen.
c. Heart blood.
d. Colon.
e. Urine.
11. Levels of gamma globulin above 1 gm o/o are effective in preventing coli septicemia. Calves with levels greater than 2 gm o/o seldom develop severe diarrhea. How much parenterally administered adult bovine serum would it take to achieve these amounts in a 100-pound calf?
a. 10 to 20 cc.
b. 20 to 40 cc.
c. 200 to 500 cc.
d. 1 to 2 liters.
e. 3 to 6 liters.
12. How often must a prepartum cow be observed in order to assure that her calf will receive adequate colostrum:
a. Every 2 hrs.
b. Every 4 hrs.
c. Every 6 hrs.
d. Every 8 hrs.
13. The optimum amount of colostrum for a 100-pound calf is?
a. 1 pint.
b. 1 quart.
c. 5% of body weight.
d. 10% of body weight.

14. The use of fermented colostrum has become very popular. Which of the following statements about fermented colostrum is false?

- a. Colostrum from a cow treated for mastitis should not be used.
b. Stir the mixture twice daily.
c. Keep container covered.
d. Once proper fermentation has started, don't change the batch, just keep adding more colostrum.

15. A client has 100 calves, 400-500 lbs., involved with a non-responsive respiratory problem along with a bloody diarrhea in several of the calves. Clinical picture:

1. Temperature 101-104°.
2. Complete anorexia in 30% of calves.
3. Rumen stasis.
4. Death loss over 3 weeks of 9 calves.
5. Chronic coughing and moist rales.
6. Klebsiella - isolated by laboratory - no virus isolation.
7. Immunization history (Vac. 1 mo. before): Nasalgen-P, CS-P (2 clostridia and bivalent pastuerella), Poured for lice (Boanna), Wormed by injection (Ripercol).
8. Diet: (silage, oats, protein supplement of 1 lb. urea/head/day. H_2O unlimited.

What is your diagnosis?

- a. Chronic respiratory disease.
b. Engorgement toxicity.
c. Urea toxicity.
d. Salt poisoning.

Answers: Part I

1. Answer: C. A.I. on basis of standing heat (middle or last half). Insemination based on palpation gives *lower* pregnancy rates compared to insemination during good *standing* heat (when the cow would *stand* for a bull).
2. Answer: C. 15 days.
Normally, there is 1500 ml lochia on day 2, 500 ml on day 8, and only a few ml on day 15 (Roberts' text-p. 210). The uterus can be easily examined after day 15 and should not have palpable lochia.
3. Answer: B. 15-20 days after calving.
A total of 57 normal cows had their first, second, and third ovulation, 20, 44 and 64 days after calving, respectively. There were 15 of these 57 cows that did not ovulate until 30 or more days after calving.
4. Answer: B. Inject 20 mg ECP.
Results of a recent trial showed 20 mg of Upjohn's ECP aborted 7 of 10 heifers within one week. Ten mg of ECP was much less effective. Prostaglandins aborted 20 of 20.
5. Answer: B. 5,000 units HCG in vein, or Answer: D. 10,000 units HCG in muscle.
5,000 units I.V. or 10,000 units I.M. gave best results; 2,500 units I.V. or 5,000 units I.M. gave slightly poorer results.
6. Answer: C. 15-30 days.
Most cows have a normal estrus 15 to 30 days after treatment. The owner should probably be advised to breed on the first good *standing heat* that he observes.
7. Answer: D. All of the above.
A and B appear to work okay.
8. Answer: C. Treat all cases with HCG.
Forty two cases of "early" cysts were not treated and 29% recovered within 30 days (some of the soft cysts ruptured during the exam).
We should expect 70-80% of treated cases to recover within 30 days.
9. Answer: B. Middle or last half of estrus.
Critical studies show that pregnancy rates are highest at the middle of estrus and begin to fall off toward the end of estrus.
10. Answer: B. 55-70%.
Most studies show a "calf crop" of 55 to 70% from only one breeding.
11. Answer: B. 40-55%.
California, New York and Minnesota report first A.I. service con-

ception rates of 44 to 54%.

12. Answer: E. None of the above.

Most hormones injected during estrus either lower or have no effect on pregnancy rates.

13. Answer: C.

If all cows were inseminated at the same time that cows would stand for a bull, A.I. pregnancy rates would increase.

14. Answer: B. Management.

Most studies fail to show that nutrition, high milk production or disease cause repeat-breeders, so we are left with "people" problems. How many herds using fertile, disease-free bulls have repeat-breeder problems?

15. Answer: D. All of the above.

Some cows show the above signs one or two days before coming into standing heat.

16. Answer: E. Check out A.I. timing and technique.

This request comes primarily from clients who just can't get cows pregnant very well with A.I. However, just telling a client how to use A.I. properly rarely changes anything. (D.—usually shows the client that the cows are normal.)

17. Answer: E. All of the above.

Retraction makes palpation much easier. Locating the CL and side of pregnancy may save time. The cord lies near the attacked border so the finger and thumb must encircle the entire horn to pick up the slip.

18. Answer: A, B, C, D and E.

In this case the veterinarian got up enough nerve to ask the client to pass a pipette for him. It was obvious that the client could not pass a pipette into the cervix.

Answers: Part II

1. Answer: 2. 1.0%; and Answer: 3. 1.5%.

1 to 1.5% Dicalcium Phosphate will supply ample Ca and P for a wide range of feeding conditions. Monosodium Phosphate can be used in a high % legume diet, however, cost is usually two times greater.

2. Answer: B. 50,000 + 25,000.

There is no evidence that greater amounts are of benefit. Need not feed any when on pasture (sunlight) or high legume diets where feed is not more than 6 mo. old.

3. Answer: D. 100 gm.

20-30 gm. maintenance + 70 gm for milk production.

4. Answer: C. 27-33%.

Less than 25%—problems with mold may be encountered. Greater than 35%—may have abnormal fermentation.

5. Answer: C. Length of cut of haylage; or Answer: D. Prepartum feeding and housing.

The problem is most commonly associated with feeding an all-silage dry-cow ration especially if too finely chopped. In those situations, best recommendation would be to feed at least 1/2 their ration of long hay.

6. Answer: C. 55% moisture and 1/4" cut.

1. Field losses are minimal between 50 and 60% moisture.

2. The use of a screen or recutter, which allows greater storage per volume, is uneconomical because of greater power requirements, potential butterfat depression and possible increased incidence of displaced abomasum.

7. Answer: D. 16%.

Lactating cows producing over 65 lbs. of milk require a 16% crude protein ration on a dry matter basis.

8. Answer: D. 40-50 lbs.; or Answer: E. > 50 lbs.

The average early lactation cow should have a % dry matter intake of 3.2 - 3.5% of body weight.

9. Answer: C. SGOT increased; or Answer: D. CPK increased.

Urinary creatinine increases; calcium does not change.

10. Answer: A. Cl; or Answer: D. K - Lost through kidney.

Na and HCO₃ are elevated.

11. Answer: B. Give a through physical exam; and Answer: E. Routinely recommend clients recall in 6-8 hrs. after first treatment.

The results of your physical examination would determine whether or not further clinical tests and treatment were indicated. If SGOT levels were greater than 1000 IU, the possibility of a recovery is nil!

12. Answer: B, D, and E.

C. is an effective recommended nutritional program.

13. Answer: A. Temp. 98-104° F; B. Near normal G.I. motility; C. Some dehydration; E. Behavioral changes are usually observed. Usually seen in first two months.

14. Answer: E. Discontinue administration and initiate resuscitatory measures as indicated.

B. Not practical; C. Very good but causes bloat; D. Causes ventricular fibrillation. 50% of these animals are already experiencing ventricular fibrillation.

Answers: Part III

1. Answer: C. Poor milking practices and cooling of milk.

2. Answer: C. Strep agalactia.

High bacteria counts are not usually seen with high rates of under infection except Strep agalactia.

3. Answer: D. E. Coli. The effect of endotoxins. Rumen atony may also be observed with a staph infection but is usually less dramatic and less acute.

4. Answer: D. Run CMT and discard the milk from the 10% of cows with the highest reaction.

5. Answer: D. Most cases reported in the literature are attributed to the use of "homemade" and multiple dose vials of antibiotic preparations.

6. Answer: D. Do not treat.

Self-cure rate high on most yeast organisms.

7. Answer: False. Recent data shows no effect.

8. Answer: False. Less than 50% recovery is about all that can be expected. This is probably due to host defense mechanisms.

9. Answer: Neither answer is absolutely correct. The point of this question being that although the somatic cell estimations are good screening tests, both tests must be used together, each interpreted in light of the other.

10. Answer: False. This is very uncommon.

11. Answer: False. The first portion of this statement is true and because of this there will be some organisms in the teat canal and even in the teat sinus which are not really infecting the gland. Because of this the best samples are taken from foremilk after a few strips have been discarded.

12. Answer: A. Auscultate the rumen; due to the effects of the endotoxins the rumen is atonic.

13. Answer: A. Trim dew claws; and B. Surgically remove medial dew claws.

14. Answer: A. Sucking calves housed in groups; fed milk from mastitic cows that had been treated.

15. Answer: A. Advisability of using diuretics that contain steroids.

16. Answer: E. All of the above.

Answers: Part IV

1. Answer: C. Significantly decreased total serum plasma proteins.

2. Answer: A, B, C, D and E. All of the above.

3. Answer: D. White muscle disease.

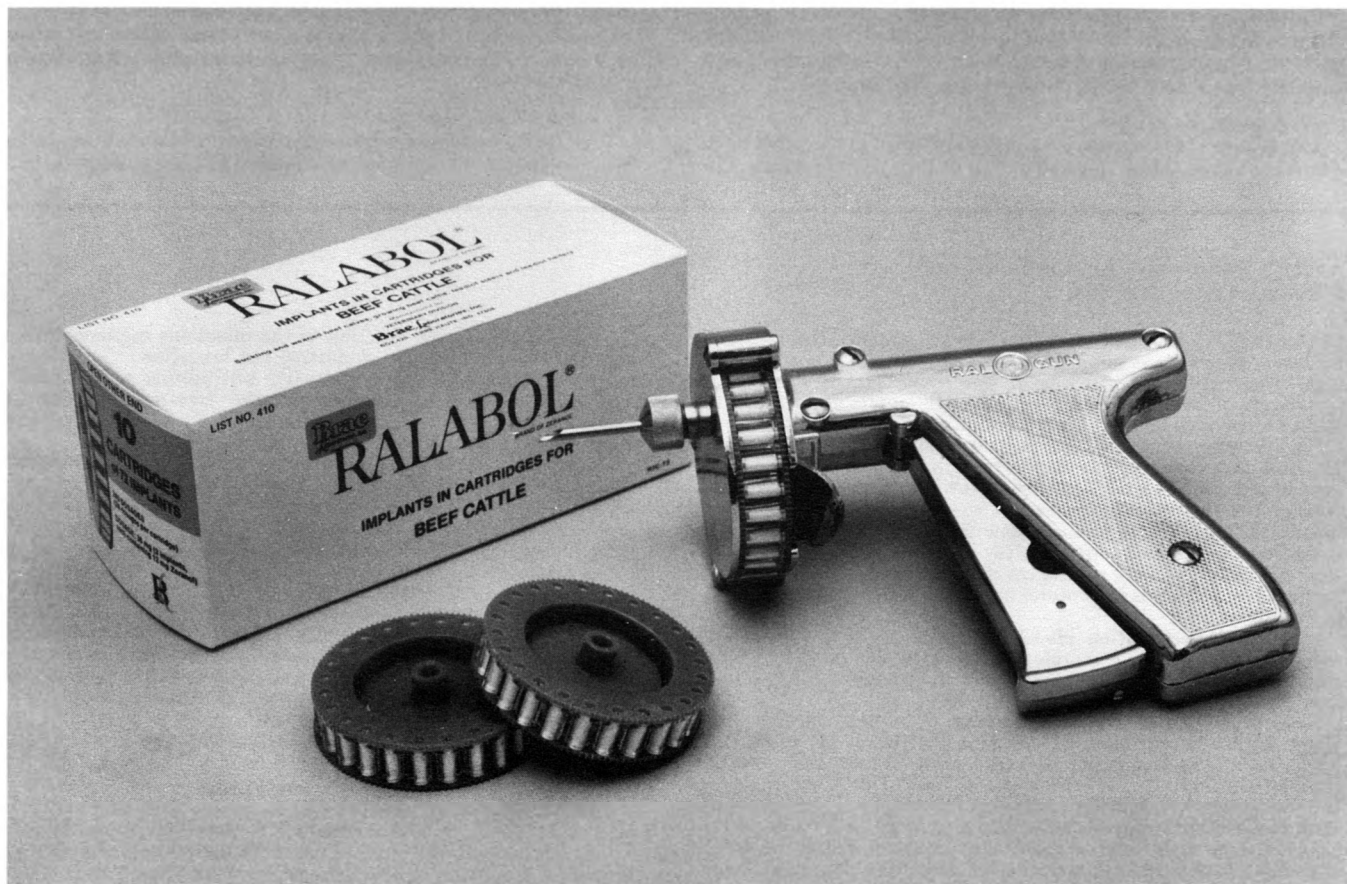
4. Answer: A. Crude fiber content of 0.5% or less; Answer: B.

(Continued on page 158)

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Protein content of at least 24-28%; and Answer: C. Fat levels approximately 10-20%.

A calf less than three weeks of age cannot digest carbohydrates from plant sources, therefore D is an incorrect answer.

5. Answer: E. All of the above.

6. Answer: A. A major cause is intestinal HCO_3 loss; and Answer: D. Peripheral vasoconstriction results in oxygen deficiency to the tissues, and anerobic metabolism.

7. Answer: B and D.

8. Answer: E. All of the above.

9. Answer: A. Zinc sulfate turbidity.

Culture and sensitivity may be helpful in treatment but gamma globulin levels would better lead to an understanding of the herd problem. Administration of antibiotics to calves with inadequate antibody levels does not improve resistance to septicemia.

10. Answer: E. Urine.

The septicemia organism is more concentrated in the urine than any other tissue. Most calves dying of coli septicemia have some

urine in their bladder and an uncontaminated aspirate can be easily obtained.

11. Answer: E. 3 to 6 liters.

This approximates the calf's blood volume. Even with concentrated serum, it would be difficult to obtain gamma globulin levels similar to that achieved from appropriate amounts of early colostrum feeding.

12. Answer: C. Every 6 hours.

13. Answer: C. 5% of body weight.

This is about as much as a calf will drink if allowed to suckle to satiation twice within the first six hours of life.

14. Answer: D. Once proper fermentation has started, don't change the batch, just keep adding more colostrum.

Combine only the colostrum from cows fresh within one or two days of each other and clean container thoroughly before starting another batch.

15. Answer: C. Urea toxicity.

Urea toxicity, complete dramatic recovery when soybean replaced urea. No chronic respiratory disease - G.I. tract normal.

APHIS: Researchers Aid Cattle Industry ... (Continued from page 106)

Center (NADC) in Ames, Iowa, Dr. George Lambert, the assistant director, reported several preparations exhibited encouraging signs. Meanwhile, a University of Wisconsin team is working on techniques of fractionating the brucella cell and its antigenic fractions for use in improved vaccines and diagnostic tests.

"In summary, we must choose between safety and efficacy," said Dr. Lambert, detailing the search for new ways to use Strain 19, normally reserved for calfood vaccination. NADC researchers exploring yearling vaccination expect to culminate their study by March 1979. This work will continue the controlled study nearing completion on mature cows. Dr. Ray is scheduled to report in the near future on the field results involving adult vaccination in approximately 350 herds in 12 states and Puerto Rico, a project begun in February 1977.

The recent exploration of adult vaccination has followed a successful study of five commercial herds by Dr. Nicoletti. As a result of this work, the USDA was able to approve adult vaccination plans for large, badly-infected herds.

Less promising is the development of a new vaccine. Dr. Margaret E. Meyer, epidemiologist at the School of Veterinary Medicine at the University of California at Davis, has recently completed her study of a French strain, H-38. Her results support the view that the protection provided by this vaccine is equal to that afforded by Strain 19, but it had significant disadvantages in that it caused high residual vaccinal titers and required two doses of vaccine for maximum protection which caused persisting tissue reactions.

"Many of these areas have received attention in the past, so we don't expect dramatic breakthroughs," explained Dr. Ray. While the APHIS epidemiologist could foresee new protection techniques involving cell transfer to supplement or even supplant the live vaccines, he cautioned that complications such as cell rejection may arise.

Treatment and Management Studies

One of the obstacles in the treatment of brucellosis involves the intracellular nature of the bacteria. The parasite invades the cells of the host's lymph nodes, udder and uterus, thereby protected from drugs injected into the bloodstream. Dr. Norman B. McCullough and Dr. Terry Conger at Michigan State University have been attempting to harness cell-mediated immunity to overcome the shielded bacteria. T-lymphocytes play an active part in

the process by quickly reacting to the infectious microorganisms and activating other cells to destroy the brucellae.

Dr. Ray expects ventures with antibiotics will resume. Tetracycline, used successfully in the treatment of human brucellosis, has been found to cure some test animals, but only suppress symptoms in others, thus clouding diagnosis of the disease. Nonetheless, tetracycline may be of value in suppressing the discharge of brucella cells by host animals, rendering it potentially useful in large herds. A European antibiotic, Rifampin, has been used to treat human brucellosis and tuberculosis, but cannot be widely used because some bacteria rapidly develop tolerance to this drug.

"We may need to devise program methods to handle the possibility of latent infection in calves from infected dams, though generally this problem is self-contained if the calves remain in the herd," said Dr. Ray. Although considered minor, the potential threat of some calves carrying brucellosis represents another area requiring scientific activity. Researchers at Auburn University in Alabama are raising calves of reactor cows to determine the seriousness of this problem and possible solutions.

Outlook for the Future

Justification for optimism can be found at Ames, where diligent scientists at NADC and APHIS's National Veterinary Services Lab study bacteria and infected herds. Federal funds have been extended to the fifteen university research teams which have undertaken explorations in brucellosis detection and immunity.

"Leading scientists and eager young pioneers are actively searching for improved eradication methods, and as long as congressional funding continues, we're in good shape," commented Dr. Lambert, adding his belief that the USDA will provide further encouragement for brucellosis research.

"Social, political and economic problems of the program," Dr. Goode stressed, "represent non-scientific barriers before the goal of conquering brucellosis." Eradication cannot be accomplished unless all concerned cooperate in putting the fruits of research into practice. He echoed the sentiment of many researchers that current knowledge and conscientious herd management comprise the primary elements of the eradication effort. New discoveries will provide the icing on the cake by saving money and time and by improving health in the cattle industry.



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