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FACT SHEET

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ANAPLASMOSIS OF CATTLE

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Anaplasmosis is an infectious disease of cattle, characterized in the acute form by fever, anemia, weakness, constipation, yellowing of the mucous membranes, lack of appetite, depression, dehydration, labored breathing and, if the female is involved, abortion or temporary infertility. Animals surviving an acute attack often show slow recovery, resulting in the loss of production of either milk or meat. Untreated animals may die. The disease is generally mild in calves up to 6 months of age, but more severe and often fatal in older cattle. Susceptible animals may suffer up to 70 percent losses during a severe outbreak; however, mortality is generally between 5 and 40 percent. Previously exposed or "carrier" animals are resistant to reinfection.

Surveys of economic losses caused by anaplasmosis, even though incomplete, indicate that annual losses in the U.S. may be as high as $100,000,000. Losses may be even higher if one includes those resulting from reduced meat and milk production and the labor connected with treatments and prevention of the disease.

SIGNS OF THE DISEASE

The characteristics of anaplasmosis are influenced by the age of the animal, virulence of the anaplasma parasites and amount of exposure. The infection can cause a rise of body temperature followed by a progressive anemia or loss of red blood cells. Be on the lookout for an especially rapid form of anaplasmosis in which cattle may die within a few hours after the onset of infection. This generally is called the peracute form. In addition to anemia, milk flow is suspended, very rapid respiration is noted and affected animals may exhibit irrational behavior or signs of nervousness.

Most symptoms depend on the stage of the disease. The signs are more pronounced in the acute form of the disease; however, a loss of weight and general emaciation is common during the recovery phase. These conditions are characterized by pale mucous membranes and jaundice.

The time of incubation of the anaplasmosis organisms varies considerably. Under field conditions, it generally ranges from 16 to 40 days, but may extend to 3 months, according to some observers.

Animals that survive the infection become "carriers." Carrier animals are resistant to reinfection, but can be a source of infection to susceptible cattle. Infection can be spread by the tick or insect vectors or by the mechanical transmission of infected blood while bleeding or working cattle.

GEOGRAPHIC DISTRIBUTION

Anaplasmosis is present in most tropical and subtropical areas of the world and in many temperate zones of North America. The distribution generally is limited to those areas having adequate vectors, but the wide variety of transmitting agents results in extensive distribution. A recent U.S. survey indicates that anaplasmosis is a serious cattle disease in the Southeast, Northwest and Pacific Coast areas of the U.S. This is especially true during the summer season or whenever vectors are numerous.

Distribution and incidence of anaplasmosis in Texas is well indicated by the accompanying map. There appears to be high incidence in area A. This covers areas along the Gulf Coast in Southeast Texas, starting near San Patricio County in the south and extending to Orange and Hardin counties to the northeast. A second area of equal severity is the northeastern corner of Texas, bordering Red River County south to Harrison County. This comprises a belt about 50 miles wide, apparently where vector activity is most intense. A secondary area where the disease is of medium incidence (area B) extends from Southeast to Northeast Texas and inward for about 150 miles. The

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disease occurs in a low incidence (area C) over approximately the entire eastern half of Texas.

Occasional pockets where anaplasmosis can be a severe problem exist in many areas since the incidence of the disease appears to depend on the number of insect and animal carriers. The vector population of a given area varies from year to year, depending upon climatic factors. In one area, principally in the Texas Hill Country, apparently the winter tick is a transmitter of anaplasmosis during the colder months.

TRANSMISSION

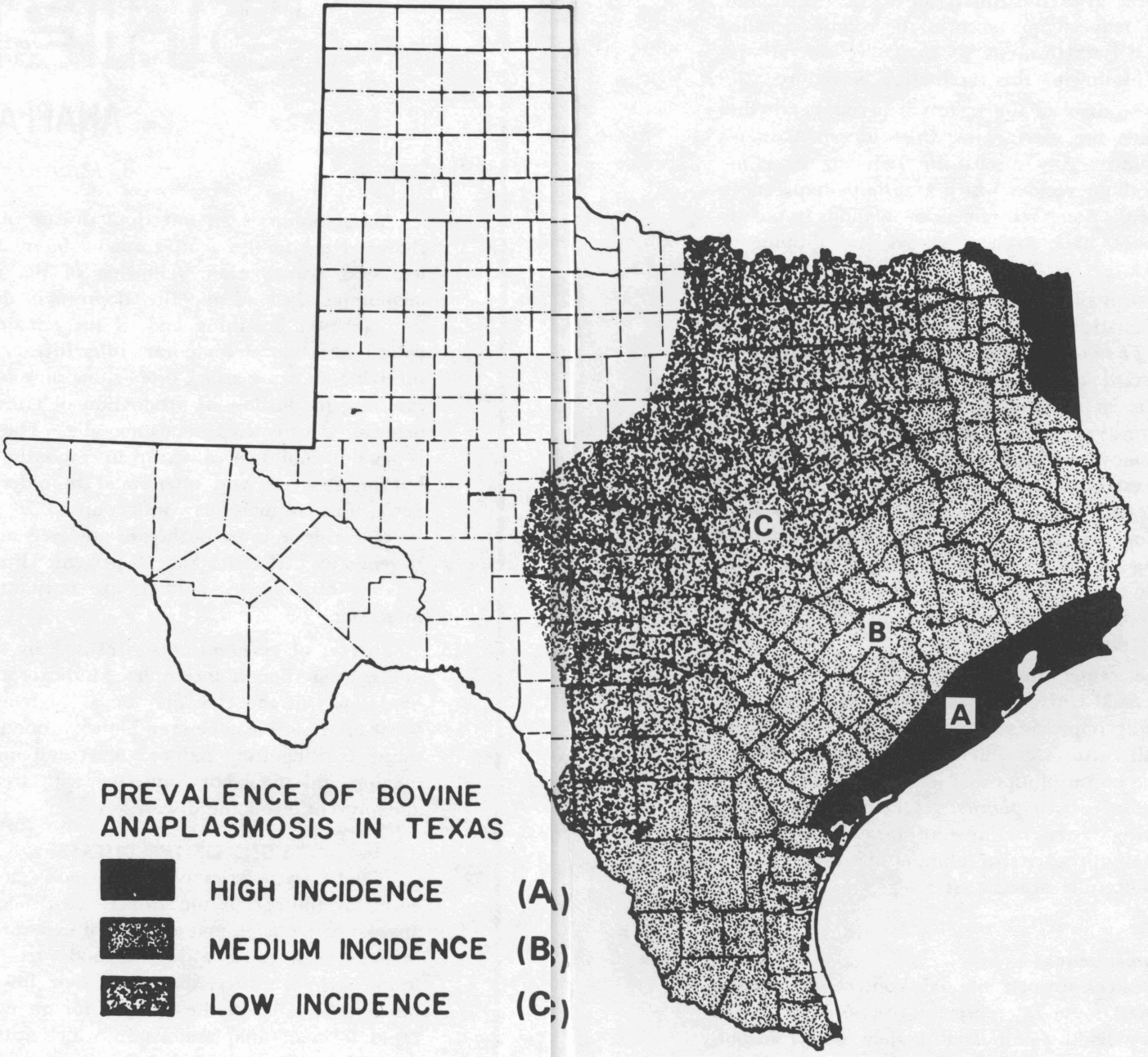
A large variety of insects and ticks may serve as transmitting agents. These vectors in some instances are true biological carriers; in others, transmission occurs by mechanical means. Any transfer of infected blood to susceptible cattle, even in minute amounts, can produce infection.

At least 20 species of ticks have been shown to transmit infection, including *Boophilus, Hyalomma, Rhipicephalus, Dermacentor, Ixodes,* and *Haemaphysalis* ticks. Ticks in Texas which can transmit anaplasmosis are the following: *D. variabilis* (American dog tick), *D. albipictus* (winter tick), *Ixodes scapularis* (black-legged tick), *B. annulatus* (Texas fever tick) and *B. microplus* (tropical cattle tick). More research is needed to determine the role played by other species of ticks in the transmission of anaplasmosis.

Several species of biting flies may be capable of transmitting anaplasmosis in Texas, principally the tabanids (horse and deer flies). However, other insects are potential vectors such as the horn fly (*H. irritans*), stable fly (*S. calcitrans*), black flies or buffalo gnats (family *Simulidae*), biting midges and mosquitoes.

Transmission of anaplasmosis by biting flies reportedly occurs only within a few minutes after a blood meal has been obtained from an infected animal. The situation is much different with ticks, as the organism can maintain itself in this host for an extended period of time.

Stockmen should understand that transmission of anaplasmosis can occur when infected blood from one animal is carried mechanically to a susceptible animal. Infected needles for bleeding or inoculating, dehorning saws, nose tongs, tattooing instruments, ear notchers or knives for castration all may spread the disease.



Hosts

The principal host for anaplasmosis in Texas is cattle. Sheep, goats and white-tailed deer (*Odocoileus virginianus*) can be infected artificially, but the role of these animals in the transmission of anaplasmosis to cattle is undetermined.

DIAGNOSIS

In the field, acute cases of anaplasmosis are characterized by pale mucous membranes, rapid breathing, weakness, muscle tremor, jaundice and elevation of body temperature as high as 107 degrees F. A firm diagnosis of anaplasmosis requires

laboratory confirmation. There are usually no recognizable signs of chronic anaplasmosis, and the diagnosis of this type infection is dependent on blood serum tests.

A number of blood tests are available for the diagnosis of anaplasmosis. The oldest and still a standard is the complement-fixation test (CF). A capillary-tube agglutination test has been used and, in recent years, a card agglutination test has been developed. Both of these procedures compare favorably with the CF test, all showing a high degree of correlation. The card agglutination test was developed primarily for field use and can be conducted on the ranch within minutes of taking the blood sample.

Differential Diagnosis

Anaplasmosis may be confused with other diseases such as Texas fever, leptospirosis or other infections which may result in anemia. Bloody urine occurs with Texas fever and leptospirosis, but is not seen with anaplasmosis. Young animals are more resistant to anaplasmosis and more severely affected with leptospirosis than are older animals, whereas age is not so much a factor with other infectious diseases.

Identification of the anaplasma organism, confirmed by a positive serological test response, is essential for definite diagnosis.

TREATMENT

Many drugs have been used in an effort to cure or prevent anaplasmosis, but only a few have been effective. To date, only the tetracyclines (chlortetracycline, tetracycline hydrochloride and oxytetracycline) have been useful in reducing the rate of multiplication of *Anaplasma* parasites and on the course of the disease. However, it should be remembered that tetracycline medication should be applied *in the early stages* of the disease for best results. If treatment is not started until considerable loss of blood has occurred, the chances of recovery are diminished. The tetracycline compounds can be given by injection or by feeding. Three to 5 mg. of tetracyclines per pound of body weight given in one to three injections over a period of days has proved beneficial in the treatment of acute anaplasmosis.

Tetracyclines will prevent animals from becoming infected when fed daily at the level of 0.5 gram per 1,000 pounds of body weight through the heavy insect season. To avoid misuse of the drug or improper application, consult your local veterinary

practitioner. Drug treatment should be carried out under his supervision. This is especially important in dairy cattle to prevent drug residues in market milk.

In addition to the tetracyclines, other supportive treatments are useful such as proper feeding, nursing, and the use of tonics and cathartics for digestive disorders. Because of the anemia caused by red blood cell destruction, animals should be handled carefully with a minimum of exertion or restraint.

Because of the high cost and other disadvantages of antibiotic therapy, investigators recently have tested two new compounds having a specific therapeutic effect against anaplasmosis. When and if they become available commercially, they may prove a more practical and economical approach for treatment of anaplasmosis.

CONTROL OF ANAPLASMOSIS

Anaplasmosis control programs are complex. To prevent losses, four approaches are possible:

1. Control of the disease by drugs.
2. Control based on blood serum diagnosis and the removal of reactor animals.
3. Control by vaccination (killed or live vaccines).
4. Control of the vectors.

The choice of methods depends largely on management systems and epizootiological (disease occurrence) factors. Where the owner can check his animals daily, he can control anaplasmosis by the use of drug treatment for the elimination of carriers. On large ranches, especially those located in an area of high anaplasmosis incidence, drug therapy may not be practical because of the cost of the drugs and labor needed for repeated treatments. Vector control, if complete, would be effective, but at present this often is impossible.

However, a degree of vector control will assist any control program. Vaaccination with a killed vaccine product can be applied on a large scale to stimulate immunity against anaplasmosis when risk of infection is high.

A vaccine is available in the United States; the manufacturer recommends that it be given in two separate doses spaced 4 weeks apart to open cows and heifers. A single booster dose should be given in 1 year after the initial series. Research indicates a reduced incidence of the condition called neonatal isoerythrolysis (N.I.) or "yellow calf syndrome" following this vaccination procedure.

The control of the vectors is necessary whether ranchmen use vaccines or drugs for anaplasmosis prevention. Any mechanism reducing or eliminating those vectors which transmit anaplasmosis is helpful. Some recommended methods in use are dust bags, back rubbers, sprays and dipping of livestock.

Control of anaplasmosis in the U.S. by means of systematic eradication programs is most desirable. *The identification and removal or separation of infected animals from non-infected susceptible cattle is an essential first step.* Good diagnostic tests are available to identify the infected carrier. The removal of carrier cattle can be accomplished by the establishment of two herds, one infected and one clean, with strict isolation of the two herds. Infection can be eliminated by the treatment of reacting cattle to remove the carrier status, or by the sale for slaughter of all carrier animals. Vector control measures are an important adjunct to any control program.

The center for Tropical Animal Health at Texas A&M University has several research projects aimed at improving vaccines through the use of tick cell cultures and determining whether continued use of antibiotics will select tetracycline resistant strains of *Anaplasma*. Treatment techniques are being tested in hope of developing a more practical approach for eliminating carrier infections. Results are encouraging.

Recommendations

Livestock owners should contact their local veterinarian or a representative of the Texas Animal Health Commission if they suspect an outbreak of anaplasmosis in their herd. Obtaining a proper diagnosis is important in order to start preventive measures necessary to control the disease.

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