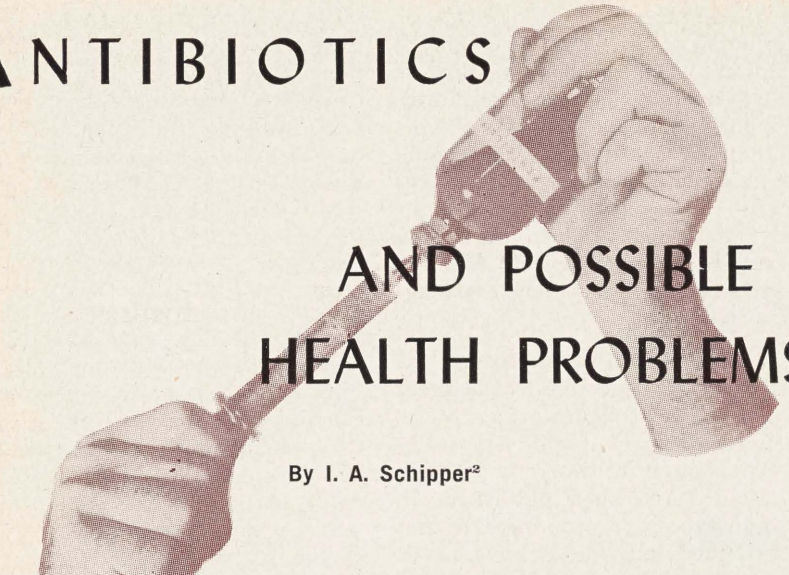
ANTIBIOTICS AND POSSIBLE HEALTH PROBLEMS[1]



By I. A. Schipper[2]

THE discovery of penicillin initiated extensive research and development of numerous similiar agents as a means of combating disease. Rapid advancements in mass production during and following World War II have made these agents readily available for human and veterinary medicine. Every year scientific investigations present new applications for antibiotics in agriculture. Today antibiotics are used as livestock growth promoters, in disease prevention, as meat preservatives (acronized poultry), for bloat preventives and in the treatment of livestock disease.

The extensive human contact with antibiotics through their application in agriculture has brought warnings from workers in human medicine of the possible ill effects that may result. To appreciate realistically the prospective dangers to humans one must be aware of the known problems already facing the medical profession due to extensive human contact with antibiotics. These include the development of disease organisms resistant to antibiotics.

Resistance of human pathogens (Micrococcus) to penicillin was 14 percent in 1945. Today this has increased to 75 percent. Resistance to tetracyclines (Aureomycin and Terramycin) was 42 percent in 1951 and had increased to 61 percent by early 1953.

Investigations have demonstrated drug resistant organisms in poultry, swine and calves following low level feeding of tetracyclines. In many instances, drug resistant organisms were found in the feces of nursing pigs whose mothers had been fed tetracyclines.

Another problem resulting from misuse of antibiotics is alteration of the normal bacterial flora. All animals, including humans, depend on bacteria for normal digestion of food. Low levels of antibiotics will alter the normal bacterial flora, destroying some necessary organisms and thus permitting the increased production of others. The end result is usually digestive upsets with acute intestinal disturbances.

Antibiotics administered as a dis-

ease preventive will often mask or alter known recognized disease symptoms. The masking process often hinders diagnostic procedures, thus prolonging the period of identification and the desired medication. Frequently, over medication is observed, the end result being an illness and/or death due to medication toxicity. This condition is too frequently observed in veterinary diagnostic laboratories.

The aquisition of sensitivity to antibiotics presents one of the great public health problems today. Numerous reports of reactions, many severe enough to warrant medical attention, have been published. In some instances, records indicate that the affected individuals have never received antibiotics deliberately. In too many instances, fatal anaphylactic reactions have resulted.

Since anaphylactic reactions are the result of a previous contact with the causitive agent, it is evident that inadvertant or diliberate exposure to antibiotics through existing avenues of free access are playing an important part in producing antibiotic sensitivity in humans. One might speculate that antibiotic hypersensitivity in humans may result from handling or consumption of foods containing antibiotics.

Of the various uses to which antibiotics are put in the livestock industry, probably the prophylactic and therapeutic applications in bovine mastitis have been most abused. Extensive advertising and free access to antibiotic preparations have extensively promoted existing abuses. The advocation of the employment of antibiotic preparations as prophylactics and uses on an emperical therapeutic basis have have been the end result.

A national survey indicated penicillin to be present in 5.9 to 11.6 percent of bottled milk following complete processing for home delivery. Concentrations ranged from 0.003 to 0.550 units per milliliter or as much as 550 units per quart. Other antibiotics less often utilized in mastitis treatment were found to be present in concentration of 0.011 to 1.0 micrograms per milliliter.

Canadian investigators[1] demonstrated the presence of antibiotic resistance known and potential human pathogens in cheese. They concluded that their "results suggest the possibility that where penicillin or other antibiotics are used with dairy cattle, the survival of resistant organisms may lead to widespread distribution of resistant strains into the homes of the general populace, since staphylococci and streptococci, often in large numbers are of common occurrence in cheese. Foods so contaminated may well contribute to the severity of the problem arising from infections in man with resistant strains without the patients having received prior antibiotic therapy or without having been exposed to endemic infections within hospitals."

Numerous workers have demonstrated the presence of antibiotics in milk for 72 hours following intramammary infusion. On the basis of these findings, it is recommended that all milk obtained for 72 hours following antibiotic administration should not be utilized for human consumption. No means of enforcing this recommendation are presently available.

The responsibility of preventing the adulteration of milk with antibiotics rests with the dairy farmer. If this responsibilty is not shouldered by all milk producers, restrictive regulations and laws are inevitable.

The various commercial preparations available to the dairy farmer should be used only on the advice of a veterinarian. Mastitis can be prevented (See NDAC Extension Circular A-219—Prevent Mastitis).

The main factors in mastitis control are: (1) Use good milking practices. (2) Make routine use of the strip cup, as a means of early detection of mastitis. (3) Milk out infected quarters at half hour intervals. (4) Avoid highly advertised remedies. (5) Call your veterinarian early —don't try advertised remedies first.

Good management and competent veterinary service are the answers to successful mastitis prevention.

Mastitis prevention is the best solution to the existing problem of antibiotic-adulterated milk for human consumption.

Bibliography

1. Thatcher, F. S., and Simon, W. The Resistance of Staphylococci and Streptococci Isolated From Cheese to Various Antibiotics. Canadian J. Public Health, pp. 407-409, Oct. 1955.

[1]Published with the approval of the Director, North Dakota Agricultural Experiment Station, Fargo.
[2]Assistant Veterinarian.

CARAGANA

VARIETIES FOR *North Dakota*

By Donald G. Hoag[1]

THE genus Caragana has been variously referred to as Peatree or Peashrub. The latter name seems more appropriate since, without exception, the introduced species are shrubby in habit.

This hardy and relatively drouth resistant group of shrubs is native from Russia through Turkestan and Siberia to Manchuria and north China. All species tested appear resistant to lime induced chlorosis and are, therefore, well adapted to the soils of the northern Great Plains.

Although very limited numbers of Caragana species or varieties are usually found in local commercial listings, there are others of horticultural interest. At least one little known variety has greater ornamental value than the two or three species commonly found in commerce.

In the minds of many, the Siberian Peashrub (*Caragana arbor-*