

## SCIENCE IN APPLIED AGRICULTURE

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With the advent of the wonder drugs we have seen increasing incidence of fungus infections in our food-producing animals.

Many clinical reports of recent years have indicated that fungus infections may arise during or following oral antibiotic therapy. These superinfections may complicate treatment for the original disease. The overgrowth of mycosis arising as a result of promiscuous use of oral antibiotics may have clinical manifestations. In our animals we recognize gastrointestinal distress including diarrhea, gas distention, itching of the ani, vulvitis, and thrush in the mouth. Therefore, one must consider lesions from one end of the body to the other.

It is well known that bacteria by their activity limit the growth of fungi in the respiratory and intestinal tract. The elimination of a part of this natural flora may so disturb the normal balance of these organisms that saprophytic strains of bacteria or fungi become pathogenic and sometimes are overwhelming.

It is not always appreciated that infections due to these resistant fungi or bacteria may be serious. One of the risks of using antibiotics promiscuously is that their selective action may disturb the normal bacterial equilibrium of the intestines or lung. Many of these micro-organisms are present in moderate numbers, living saprophytically or symbiotically. They may multiply and invade any tissue in any part of the animal body.

Whether new infections occur only because certain organisms normally present as saprophytes, or in small numbers, increase numerically to a point where they become invasive or whether the mechanism is a more profound one involving changes in tissues or stimulation of bacteria to become invasive is still an unsettled question.

The replacement of the gram-positive flora of the respiratory tract with gram-negative organisms, which become pathogenic, has in many cases produced death in our food-producing animals without evidence of any mycotic lesions.

Many of the organisms normally inhabiting the gastrointestinal tract of our food-producing animals are harmless in the concentrations in which they exist. Since each is competing for survival, the numbers of each species are kept relatively constant. However, if some of the susceptible bacteria are removed from the environment by oral antibiotics, a nonsusceptible organism may flourish and may cause severe damage.

The oral administration of many of our antibiotics may be their suppressive action of the normal bacterial intestinal flora, favor the development of monilial and other mycotic infections; particularly, in small swine. Prolonged use of these drugs may even cause fatal systemic mycosis.

It was not the purpose of this study to determine whether or not super-infection is more frequent in livestock that receive oral antibiotics in their feed or water than in those that are not given antibiotics. Rather, the purpose was to point out that secondary bacterial infections may occur despite the use of chemotherapeutic agents and to determine how frequently it appears as well as what factors predispose to its development. It would be impossible to give figures as to numbers or percentages, but I would say that the increase is far greater on herds of animals receiving the medicated feeds and water, although complete unanimity does not prevail on this point.

In the diagnostic laboratory which I operate, I see more cases of intractable intestinal mycosis more frequently than formerly and the cases are severe enough to cause many deaths in herds of swine.

The increased incidence is probably due, in a large degree, to the use of low-level antibiotics in some feeds, although these drugs are not the cause of all such cases because this condition has been noted in herds that have had no antibiotic feeds, although much less frequently.

I will attempt to illustrate by color slides the gross pathology that is occurring in swine herds as a result of adding low-level antibiotic residues to feed and water.

Already the farmer is in an economical squeeze concerning feed additives. He must soon choose between the types of animal feeds which he produces and those which he purchases in order to show a profit for his labor.

The combination of antibiotics with antifungous agents may be the future solution to prevent terminal mycosis.