# FOR YOUR INFORMATION

## A Mold Problem in 1972-73 Feed Grains
### Gibberella Zeae

*What is it?*

Gibberella zeae is a mold (Fusarium roseum) found on corn and some other field grains. It is a naturally occurring fungus that is a serious problem during a wet, cold growing season and harvesting period such as was experienced in 1972. The greatest problem areas in 1972 seem to be in Southern Michigan, Northwestern Ohio, and Northern Indiana — but reports indicate lesser contamination in a number of other corn-producing states.

*What are its effects?*

Three known factors produced by this mold cause feeding problems to animals consuming it. The "refusal factor" — animals refusing to eat it — the "emetic factor" — vomiting — are present in the contaminated grain, and result in reduced nutrition. The third factor, a plant estrogen, is associated with female reproductive disorders, such as abortion and infertility, particularly in swine. A fourth factor should be mentioned — T-2 toxin, a very toxic substance to both man and animals, is produced in small quantities by *Gibberella zeae.*

*What are the symptoms?*

Refusal to eat contaminated corn is the most striking symptom in swine. There also are isolated reports that poultry and cattle will refuse to eat it. The refusal factor apparently becomes a problem when infection occurs in about 5% or more of the kernels. (The observed levels found in the field this past year ranged from 5 to 7%). In addition, weight loss and occasionally death may occur as toxin levels increase. Abortions in swine are caused by the naturally occurring estrogenic factor.

*Why is FDA concerned?*

The Bureau of Veterinary Medicine (BVM) is concerned with the effect that contaminated grain may have on the health of animals consuming *Gibberella zeae* and, because of a potential hazard, the controls that might be needed on feed grain to prevent possible transmission of a toxic residue in animal tissues. FDA's Bureau of Foods (BF), in addition, is concerned with both the effect of *Gibberella zeae* in human foods, and the potential for tissue residues entering the human food chain.

*What is the background?*

*Gibberella zeae* contamination of corn has been recognized as a serious problem by various state and federal agencies. Research has been conducted largely by university personnel. Mycotoxins in grains should be recognized as emerging diseases and of growing importance. The cold, wet growing season of 1972 was ideal for the production of Fusarium mycoses. The delayed harvest contributed to the problem. Shortage of natural gas made it more difficult to dry corn. Normally, corn is dried to 14% moisture. Much of this year's corn had moisture levels ranging from 20 to 35%. Twenty-three percent moisture has been recognized as the minimal moisture level where Fusaria mycotoxin activity occurs.

*What Treatment is Available?*

Producers of *Gibberella zeae* contaminated corn have very little means available to reduce the problem. Both the emetic and refusal factors are very stable to pH changes (pH 2.0-11.0) and to heating (190°F for 5-10 minutes). The use of roasting procedures, molasses cover up, additions of sodium hydroxide (up to 10% of the weight of the corn) and spraying with propionic acid and acetic acid, have all been useless in reducing the refusal factor. Steam flaking (cattle feed procedure) and flotation of the contaminated corn in a salt solution are currently being experimented with to reduce the refusal factor activity. The trials are not completed but poor results were indicated in the initial feedback of information in these trials.

*What FDA is doing*

The principal activity of FDA shall be surveillance of human and animal foods to protect both from food intoxications. FDA programs are regulatory by nature; animal or human foods contaminated with *Gibberella zeae* are subject to seizure. The problems of the producers, shippers, processors (and FDA) will be reduced if FDA makes it clear in advance what is expected of those individuals and firms that are subject to the provisions of the law. FDA recognizes that preventive regulatory action is a necessary part of the regulatory equation and this will require close cooperation with the public and industry. Research and education may also be included among the preventive measures taken.

## Veterinarians and Commercial Feed Mixers

*What is the problem?*

Veterinarians and feed mixers may not realize

their responsibility for the use of drugs and feed additives fed to animals. Part of this responsibility relates to any illegal residue left in animal tissue at the time of slaughter.

*What is FDA policy?*

A veterinarian may prescribe and administer to his patients whatever drugs or other medicaments he may legally obtain. This constitutes the practice of veterinary medicine which is subject to state laws and not under FDA regulation.

*How does this involve feed mills?*

If a veterinarian enlists the services of a feed mill to mix drugs into a feed on a "prescription" basis, a third party to the doctor-client relationship has been introduced. This goes beyond the "practice" of veterinary medicine. This "third party" relationship makes such uses subject to FDA regulations.

*When can feed be manufactured?*

The feed mill is considered a commercial operation when it adds drugs to feed. Therefore, it is subject to the Food, Drug, and Cosmetic Act. Under this statute, a feed mill may not manufacture feed unless it is approved and, as in the case of new animal drugs requiring approval, the mill holds an approved medicated feed application (Form 1800) for a drug or combination. Also, the feed has to be labeled in accordance with the approval.

*Are other persons responsible?*

No veterinarian, practicing or employed by a feed manufacturer, nutritionist, pathologist, or any manufacturer—may authorize the using of feeds with drugs or drug combinations that are not approved for animal feeds. Any individuals so doing may be held responsible if drug tissue residues are found in treated animals resulting from the use of such unauthorized medicated feeds.

*Why is there this strict control over use in feed?*

FDA reviews each drug or combination on the basis of the data received. Approvals are given only for certain uses or claims at certain levels. These are published in the federal regulations. Before a new animal drug is marketed, FDA does a thorough preclearance review. Based on submitted data, the review is designed to ensure that the drug (1) will be safe and effective and (2) will not cause tissue residues beyond a permitted level. Unapproved drug levels or combinations are not permitted because there is no review history of data that substantiates their safety and effectiveness.

*What about other drug uses?*

The same requirements prevail for manufacturing any medicated feed or custom mix. Unless the drug premix manufacturer has submitted data for FDA's review and received approval for any new uses, he cannot mix and sell unapproved products. This also applies to other levels of the drug alone or combinations of drugs.

*What are veterinarians responsible for then?*

In addition to their patient's health and safety, veterinarians must be aware of their possible liability for residues found in food derived from food-producing animals. Any prescribing of drugs in feed which causes a residue could result in federal legal action against a veterinarian for having contributed to the shipment of adulterated food. This is because animals moving to slaughter are considered to be food under interpretation of the Food, Drug, and Cosmetic Act.

*What should a veterinarian tell his client?,*

Aside from the usual doctor-client relationship, a veterinarian should emphasize withdrawal times to livestock producers. This is especially true of any products he may have used in the treatment of his clients' food-producing livestock. Also, he should remind his client to carefully review all medicated feed labeling for warnings of proper usage and withdrawal times.

**Acknowledgements**

The above information was received from Dr. Thomas B. Snodgrass, Food and Drug Administration, Dallas District, 3032 Bryan Street, Dallas, Texas 75206.

## FDA Orders End to Use of Implants of DES

The Food and Drug Administration on April 25 ordered an end to the use of implants of diethylstilbestrol (DES) in beef cattle and sheep. The action is based on new scientific data developed by the USDA and received by FDA on April 16. This study, which used a highly sensitive radioactive tracer research technique, showed the presence of DES in the livers of beef cattle 120 days after DES was implanted in the animal's ear. Confirmed levels of DES ranged from 0.04 p.p.b. (from a half dose of DES) to 0.12 p.p.b. (from a full dose). FDA conducted analytical work to confirm that the residues were DES.

Last August, FDA banned DES from use in animal feed after a similar study showed residues in the livers of animals fed DES. The current study is the first in which residues have been traced to the use of DES implants. Previously, tests conducted with less sensitive methods had not shown the presence of DES residues after use of implants.

In today's order, FDA rejected requests for a hearing from the six manufacturers of DES implants. The agency ordered an end to all further use of implants, effective April 27. Animals already

implanted, or meat from already slaughtered animals, may be marketed without disruption.

DES has been used for over 20 years as a growth promotant in animals. It has been administered both through feed and by implanting in the ear. When use of DES was questioned in the early 1960's because of its known carcinogenicity, Congress passed a special amendment to the Federal Food, Drug, and Cosmetic Act explicitly requiring FDA to approve this use as long as no residue is found in the meat.

Mr. Sherwin Gardner, acting commissioner of Food and Drugs said, "USDA's study clearly shows that it is impossible to set rules for use of DES which will assure that no residues remain in livers of treated animals. Our action today satisfies strict provisions of the law which govern use of products such as DES, which have been shown to cause cancer in test animals."

Mr. Gardner emphasized that FDA's action was not based on evidence of any public health hazard. He said that DES has been used to promote growth of cattle and sheep for two decades without a single known instance of human harm. "The current tests, however, question the basis on which the drug was approved," Mr. Gardner said.

### USDA to Continue Checks for DES Residues

In response to the Food and Drug Administration's (FDA) action April 26, in banning diethylstilbestrol (DES) implant in livestock, the USDA said it will keep checking for residues of DES as long as use of the drug remains a possibility. Earlier, FDA banned the addition of DES to animal feed as of Jan. 1, 1973, after review of research data on it.

USDA meat inspectors will continue to sample animals at the current rate—approximately 6,000 samples yearly. If the monitoring program shows there is good compliance with the ban on DES, the number of DES analyses will be reduced and more attention directed toward other residue problems.

### Antibiotic Combinations

Of the possible causes of antagonistic responses, one of the most likely is the interaction of bactericidal (cidal) and bacteriostatic (static) drugs. Cidal drugs are those that can kill the micro-organism if conditions are favorable, whereas static drugs only inhibit growth and multiplication of the organisms sufficiently to allow the normal body defenses to act. Cidal antimicrobials are generally most effective in rapidly growing and multiplying organisms. If a bacteriostatic drug is present that inhibits growth of bacterium, it may protect the organism from the lethal effects of the cidal drug, thus obviating any benefit from the combination. Thus, in general, one should not combine a static with a cidal drug.

There are exceptions to the above rule; but these depend on such things as variations in drug distribution in the animal body, rapidity of the killing effect of the cidal drug, production of leaky cell membranes so that another antibiotic might have easier access to the interior of the bacterium, etc. These successful combinations must be detected by carefully controlled clinical trials on specific disease entities and not by impressions gained from random clinical usage. Furthermore, there is clinical evidence, that while a specific combination may be useful against one micro-organism, it may be ineffective against another. There are no theoretical reasons for not combining two bactericidal (or bacteriostatic) drugs. However, combinations should not be used routinely to "cover" incomplete diagnosis, since careless use of antibiotics can lead to the development of antibiotic resistant bacterial strains in your practice and will add to the cost to your clients.

Commonly-used antimicrobials that may be classified as cidal, depending upon the dose and conditions, include the following: penicillins G and V, Ampicillin, methicillin, hetacillin, oxacillin, cephaloridine, streptomycin, dihydrostreptomycin, neomycin, kanamycin, polymyxin B, colistimethate, bacitracin, ristocetin, the nitrofurans and gentamicin. The static antimicrobials include the tetracyclines, chloramphenicol, lincomycin, erythromycin, tylosin, novobiocin and the sulfonamides.

We should reverse our increasing tendencies toward polypharmacy as practiced in medieval times and follow the advice of a famous physician of the 12th century A. D. who said "If one can manage well with one individual drug, one should not use a compound one . . . one should use medications compounded of multiple ingredients only when compelled to do so." And we might add—only when it is known to be worthwhile.

*Gordon L. Coppoc, D.V.M.; Purdue University; As printed in Purdue Veterinary Notes.*

### Sour Colostrum for Rearing Calves

At the recent National Dairy Housing Conference, a spontaneous, extremely interesting discussion on the use of sour or fermented colostrum for rearing dairy calves took place. The idea was born in England and first presented in this country in an article in Farm Journal last spring. Dr. E. Woelffer of Oconomowoc, Wisconsin,

described what appears to be a reasonably sanitary way to feed calves soured colostrum. He has a large herd client who is putting the first seven milkings from each fresh cow into a separate container (a heavy plastic garbage bag in a plastic garbage pail. The plastic bag is kept shut by a twistem). Each time the calf is fed (twice daily) the pooled colostrum milk is stirred to prevent the formation of a scum on top of the milk. The milk is kept at milkhouse or barn temperature where it rapidly becomes sour. Calves are fed from the beginning (removed from their dams at two days of age) on equal parts of the sour colostrum and warm water with excellent results. Others in the discussion reported pooling colostrum milk from all fresh cows in large containers and allowing it to sour for one week before feeding it to calves. In this way a new batch is started each week and none of the material fed is over two weeks old. In England, however, sour colostrum has been used when it was more than 50 days old with no ill effects.

Several institutions have research projects to learn more about feeding sour colostrum. The present consensus seems to be that excellent, healthy calves can be reared from milk which would otherwise be thrown away. An added advantage is that it keeps discarded milk out of milkhouse waste disposal systems where it causes problems. The biological activity required to dispose of one quart of milk in a milkhouse waste disposal system is equal to that necessary to dispose of the daily wastes from two humans. Soured or fermented colostrum may be a very good alternative to eliminate some of the problems which have arisen from feeding less than the best quality milk replacers to calves.

### Salmonellosis in Calves

Outbreaks of salmonellosis have recently been reported in large veal calf operations. Mortality rates in these outbreaks have ranged from 20 to 40%. Most calves have originated from auction markets and the principal clinical sign has been diarrhea occurring at approximately two to three weeks of age which does not respond to antibiotic therapy. The feces usually contain mucus and blood, and the calves are febrile (105° to 106°). The predominant serotype isolated has been *S. typhimurium*. When salmonellosis is suspected, laboratory services should be used to help confirm the diagnosis.

Antibiotic sensitivity tests indicate chloramphenicol and furazolidone to be effective in the treatment of salmonellosis. The most economical drug for mass medication is NF-180. (However, it is not approved for use in calves and consequently must be used or prescribed by a veterinarian. See, "Drugs and The Law.") This product can be added to the milk at the rate of 100 mg per calf twice daily up to 30 days after arrival for the *prevention* of salmonellosis. The *therapeutic dosage* is 300 mg per calf twice daily; however, this dosage approaches the *toxic level.*

*From Michigan Veterinary Forum; College of Veterinary Medicine; MSU, February, 1973.*

# Practice Tips...

In our clinic, we find that passage of a stomach tube through the nasal cavitiy of the cow to be an advantageous procedure. The same technique and precautions are followed as for entubation in the horse. A tube of proper size is passed through the ventral-medial aspect of the nasal cavity. A tube with an outside diameter of 5/8 inches can usually be employed; however, on occasion a smaller tube may be necessary. If the situation warrants, nose tongs can be used for restraint. The advantages of this technique are: (1) the animal will tolerate the procedure if the tube is to be left in place for more than several minutes, and (2) the procedure can be conducted and medication administered without assistance.

**D. M. Blackmon,** *D.V.M.*, Athens, Ga.

For even severely dehydrated calves without pneumonia, I usually (but not always) have excellent results with minimal effort by using oral electrolytes. To a gallon of water add one tablespoon salt, one-half tablespoon baking soda and antibiotic. Glucose can also be added. A stallion catheter with funnel attached is passed through the nose to the stomach. I give up to a full gallon to a large Holstein calf.

**Allen M. Garst,** *D.V.M.*, Walkerville, Md.

When examining feet for foot rot and objects, hose foot with cold water stream from hose nozzle. Cow kicks at water once or twice and usually stops. Then examine foot, heels and interdigital space with fingers as hose is spraying. Cow cannot distinguish the water from palpation. Also, cold water numbs the skin.

**Anon.**

Use Diquel$^{R}$ (JenSal) in cows clients are attempting to give orphan calves. This calms the cow for three days or so and makes the job much easier.

**Anon.**

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