MINNESOTA FEEDSERVICE

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Science Waging War on Poultry Diseases

Coccidiosis Is Yielding To New Medical Weapons

B. S. POMEROY

Poultry disease is the biggest headache for the poultryman, but veterinary science has gone a long way in controlling this problem. In these two articles a University of Minnesota veterinarian outlines some of the control methods used against two of the worst offenders, coccidiosis and infectious bronchitis.

MEDICINES to combat coccidiosis have changed the entire poultry picture in the past five years. And in the process, the poultry industry has been saved millions of dollars.

Until rather recently coccidiosis was considered the number one disease problem of poultry, and losses of 20 per cent and higher were not uncommon. Most poultrymen considered coccidiosis as one of the risks of the poultry business and nearly every farmer had some sort of outbreak in his flock.

But medicines known as "coccidiostatic agents" have entered the picture and brightened it considerably.

Coccidiosis in Chickens

In chickens coccidiosis occurs in two forms—the cecal or bloody coccidiosis and the intestinal coccidiosis. The organism which causes coccidiosis is a parasite which invades the cells of the ceca or intestine and then is passed in the droppings. After a period of two days, under satisfactory conditions, the parasite is again infective and is ready to be swallowed by a chick.

There are eight different species of coccidia. Each one is associated with a definite type of coccidiosis. The one that causes bloody coccidiosis is the most serious one.

The intestinal species produces mild to severe forms of coccidiosis. If a bird recovers from coccidiosis it develops immunity to that type of coccidiosis only; there is no cross-protection between species.

Coccidiosis in Turkeys

Recent information indicates that there are six species of coccidia that attack turkeys—some severe and others mild. The infection in turkeys is different from that in chickens—chickens cannot infect turkeys or vice versa. Coccidiosis in turkeys is on the increase and may cause serious losses in young poults.

Coccidiosis Under Farm Conditions

Good sanitation and management are a very important phase of the present day method of controlling coccidiosis. Overcrowding, damp litter, and inadequate feeders and water fountains must be avoided. Because coccidia are widely distributed on our farms under normal farm conditions it is difficult to prevent chickens from picking up the disease. Thus the risk of an outbreak is always present until immunity is established. Because many kinds of coccidia exist there is always that danger during the growing period.

Uses of Coccidiostatic Agents

Prior to 1948 poultrymen attempted to control coccidiosis in chickens with good management practices and spot treatment with a sulfa drug. This was a decided improvement over the nonspecific treatment that was available before the introduction of the sulfa drugs. Then the development of coccidiostatic agents changed the entire approach to the control of coccidiosis in chickens.

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Inoculation May Be Answer To Bronchitis Problem

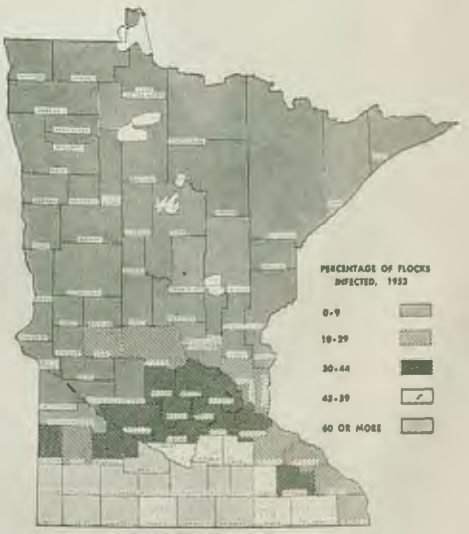
B. S. POMEROY

THE WIDESPREAD outbreak of infectious bronchitis—along with two other respiratory infections—in the fall of 1952 has focused attention on the need for control of this disease.

The outbreak was one of the worst in the history of the poultry industry in Minnesota—involving a high percentage of the flocks in 43 counties in the south and central sections of the state and as high as 90 per cent of the flocks in some areas.

Cause of the Outbreak

The survey of the affected area indicated that three diseases, infectious bronchitis, Newcastle disease, and fowl pox, were involved. In some areas infectious bronchitis was the principal disease, whereas in other areas both Newcastle and infectious bronchitis were widely present. Also in many



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Bronchitis

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areas fowl pox was more prevalent than usual.

Diagnosis of Infectious Bronchitis

In the respiratory phase, it is practically impossible to tell Newcastle disease from infectious bronchitis on the basis of either symptoms or post mortem examinations. These diseases can only be determined by laboratory tests.

After the acute respiratory phase nervous symptoms usually follow in the case of Newcastle disease but are completely absent in outbreaks of infectious bronchitis. But the absence of nervous symptoms does not eliminate Newcastle disease, because many flocks of mature birds will go through an outbreak of Newcastle disease without showing nervous symptoms.

The Effects of Infectious Bronchitis

In adult laying flocks, the effect on egg production may be moderate to severe, reducing egg production 10 to 20 per cent—sometimes even to zero within a few days. Eggs with shells that are soft, thin, rough and misshapen, or missing entirely are laid during the outbreak and for weeks and months afterwards. In fact, very few flocks ever regain normal production.

In addition to the effect on shell quality, the interior quality is also permanently damaged. The white of the egg becomes thin and watery.

Prevention of Future Outbreaks

Vaccination for infectious bronchitis presents a very complex problem. Killed infectious bronchitis vaccines have no value. At the present time, there are no commercial live virus vaccines available for use by the industry. There are one or more modified live virus vaccines under field test but whether these vaccines will be released by the United States Government is not known. The situation at the present time leaves one of three alternatives for the poultryman.

1. Avoid the introduction of living bronchitis vaccines in an area and hope that sanitation practices and good environmental conditions prevent an outbreak as serious as in 1952.

2. Introduce a few recovered adult birds into the pullet replacement flock while they are on range and before they are in production. This procedure has two important objections.
   a. The adult birds may not be carriers of infectious bronchitis and nothing happens in the pullet flock. However, unless the flock is tested by laboratory procedures, the status of the flock is unknown.
   b. The adult birds may be carriers of other diseases such as fowl cholera, coryza, "air sac infections," and leukosis and introduce serious infections into the pullet flock.

3. Inoculations with virulent infectious bronchitis virus may be used in the replacement flocks. This procedure is used between 8 and 14 weeks of age. About 5 per cent of the birds are inoculated and the flock goes through a natural outbreak with very little loss and no effect on future egg production. The development of this type of a program has just been approved by the Minnesota Livestock Sanitary Board. It will involve probably thousands of flocks and millions of birds in south and central Minnesota. The program's success will require the cooperation of the local hatcheryman, county agricultural agent, and the poultryman.

These are the regulations: The vaccine will be available to the entire state but should be confined to areas that have had an infectious bronchitis problem. A majority of the flock owners in the area should take part. The vaccine will be supplied only to the local veterinarian—to be administered at a certain time and place.

Nitrogen Ups Corn Yields

HAROLD E. JONES*

WANT BETTER CORN yields? Often you can get them by applying a nitrogen sidedressing at cultivating time, University of Minnesota demonstrations have shown.

In 1952 reports from 42 counties in the corn-growing sections of the state were gathered together and comparisons were made between sidedressing with nitrogen and no nitrogen.

* Extension specialist in soils

The procedure for the demonstrations was quite simple. The county agricultural agents merely went into the cornfields at about the time of second cultivation and applied 120 pounds per acre of ammonium nitrate (40# N) by hand with a hoe between the corn rows. The fertilizer was applied to four rows at three locations in each field.

Since weather has a bearing on the corn yields for the year, perhaps a word should be said about it. The year 1952 was an excellent corn-growing year for most of the state. Rainfall was sufficient and well distributed except in the southwestern counties and in the area around Big Stone, Traverse, and Wilkin Counties. In these sections, very little rain fell for several weeks after sidedressing, making the treatment less effective.

The weather in 1950 and 1951 had been unusually cool and wet, resulting in less nitrogen fixation by legumes than normal. The amount of soil nitrogen available for corn following legumes was considerably less during the 1952 growing season than could be expected during more normal seasons.

Here are some of the results of the trials:

Sandy vs. Heavy Soils

The average response from nitrogen sidedressing was greater on sandy soils than on the heavier soils. Nitrogen sidedressing boosted yields 11.6 bushels an acre on sandy soils and 9.2 bushels per acre on heavy soils. This difference in response can be expected most years since sandy soils are generally more deficient in nitrogen. Of interest is the fact that the sidedressing did not delay the maturity of the corn in most cases. In fact, for the sandy soils maturity was slightly improved.

Corn Yields Better After Legumes

The fields for both heavy and sandy soils were divided into those that were in legumes in 1951 and those that were not. As expected, corn after legumes on both sandy and heavy soils yielded higher than corn at least one year removed from legumes.

Nitrogen sidedressing increased yields both of corn following legumes and of corn at least one year removed. In the case of sandy soils the response, as might be expected, was greater where legumes had not been on the land in 1951. For heavy soils there was no difference in response to nitrogen sidedressing with and without legumes pre-

ceding the corn but the total yield was higher following the legume.

Good Stands Needed

The fields were also divided into those receiving some kind of a starter fertilizer in the row for corn and those that received no fertilizer except the nitrogen sidedressing.

Row fertilizer alone increased yields on the heavy soils by 12.2 bushels per acre but decreased yields 9 bushels per acre on sandy soils. This is a good illustration of the importance of having good stands when using fertilizer since the stand of corn was considerably less where the row fertilizer was applied on the sandy soils. Nitrogen sidedressing increased yields both with and without row fertilizer, but the 40 pounds per acre of nitrogen sidedressed on the sandy soils wasn't enough to meet the demand of the growing corn.

Recommendations for Nitrogen Sidedressing

In view of the results of University of Minnesota tests, **nitrogen sidedressing of corn can be recommended on all but the highest fertility level soils where corn follows legume or heavy manure applications.** On medium and low fertility soils the use of 30 to 45 pounds per acre of nitrogen (100-150 pounds ammonium nitrate) can be recommended even though the corn does follow legumes or manure. Where corn does not follow legumes or manure applications the rate of nitrogen sidedressing should be stepped up to 150 to 200 pounds per acre of ammonium nitrate depending on whether the soil is high or low in fertility.

Sandy soils will require a slightly higher rate than most heavy soils. Farmers are cautioned to be sure to maintain a high level of phosphorus and potassium in the soil if sidedressing with nitrogen since too high a level of nitrogen can delay maturity and decrease yields.

The cost of 120 pounds of ammonium nitrate amounted to $5.10 in 1952. At $1.50 per bushel for corn it took only 3.4 bushels increase to pay for the fertilizer. The average increase for all trials in 1952 was 10 bushels per acre. This left the farmer 6.6 bushels or $9.90 per acre above fertilizer cost.

There will be between 30,000 and 50,000 acres of corn sidedressed in 1953 with forms of nitrogen other than ammonium nitrate, particularly anhydrous ammonia and nitrogen solutions. These forms of nitrogen have given essentially the same yield responses pound for pound of nitrogen applied as solid nitrogen fertilizers.

Herbicides for Minnesota—1953

R. S. DUNHAM*

The following is a list of chemicals, with their uses, that will probably be used in Minnesota this year for weed control.

2,4-D, formulated as sodium and amine salts and esters.
Amine used most commonly for selective spraying in crops. Esters used for woody plants and hard-to-kill perennials where no crop is grown. If sensitive crops or plants are nearby, use low volatile esters. Sodium salt is suggested for gladioli and may usually be substituted for the amine.

2,4,5-T, formulated as sodium and amine salts and esters.
Esters most commonly used alone or mixed with 2,4-D for woody plant control. Very effective on poison ivy—especially in apple orchards. Also effective on blackberry, wild rose, chokecherry, and black cherry.

TCA, formulated as the sodium salt in both powder and liquid form.
A grass-killer that may be used on quack grass. Also effective on annual grasses such as pigeon grass, barnyard grass, and witch grass in flax, beets and sugar beets, alfalfa, many cruciferous vegetables, asparagus, and gladioli. Effective on late-germinating annual grassy weeds in corn but should be applied below the leaves after lay-by. Not effective on wild oats.

MCP, formulated as the sodium and amine salts and esters.
Most commonly used for broadleaved weeds in flax.

DNBP - DNAP, dinitro phenols, may be used pre-emergence for annual weeds in asparagus, beans, and potatoes and far grapes and gladioli. Trade names include Dow General, Sinox General, Premerge, and Chipman General.

SES, also called Crag Herbicide I, can be used for annual broadleaved weeds in asporagus, raspberries, strawberries, and gladioli. Should be used before weeds come up.

Stoddard solvent, a petroleum distillate, is recommended for weeds in asparagus, in members of the carrot family, and in evergreen trees.

Aero cyanamid is used pre-emergence on asparagus and onions.

PCP, formulated as the sodium salt, is used pre-emergence on beans and potatoes, and in vineyards.

Potassium cyanate is used on onions and also as a crabgrass killer on lawns.

PMA is also an herbicide for crabgrass.

Ammate is effective on woody plants and poison ivy.

Alanap (N-1-napthylphthalamic acid) is used pre-emergence for weeds in vine crops such as muskmelon, cucumbers, and squash.

A group of herbicides used for "soil sterilization" includes CMU, sodium chlorate, Atlacide, Polybor-chlorate, Chlorax, Polybor, and Borascu. DNAP or DNBP are dinitros that give a rapid but temporary kill of top growth. The borax herbicides are especially effective on thistles and leafy spurge. CMU and sodium chlorate are especially effective on quack grass.

Additional information will be found in Extension Pamphlet 187, *Chemical Weed Control in Minnesota*. A copy may be obtained from your county agent or the Bulletin Room, University of Minnesota, Institute of Agriculture, St. Paul 1, Minnesota.

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Coccidiosis

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The present principle is to use sound management practices to reduce the coccidia population to a minimum in the brooder house and use an effective coccidiostatic agent in the feed or water on a continuous basis.

There are four coccidiostatic agents that are available to feed manufacturers and which have given satisfactory results under field conditions. They are sulfaquinoxaline, nitrophenide, nitrofurozone, and a combination of an arsenical and a sulfonamide.

There have been many improvements in the recommended uses of these coccidiostatic agents and feed manufacturers should follow the directions of the drug manufacturers. Each drug has satisfied the requirements of the Food and Drug Administration.

Because these coccidiostats are used at levels that do not block out coccidial infections completely, mild symptoms of coccidiosis may be found under certain management conditions. The first step is to get an accurate diagnosis and if coccidiosis is the cause, use one of the sulfa drugs such as sulfaquinoxaline or sulfamethazine in addition to the medicated feed.

In turkeys the use of coccidiostats in the feed or water on low levels continuously has not been too widely accepted. But on turkey farms that raise several groups each year coccidiosis can become quite a problem. The use of a recognized coccidiostatic agent in the feed or water for turkeys may be justified on many farms.

Silage Makers Want Better Preservative

M. L. ARMOUR*

MORE THAN 12,000 farmers made hay crop silage in 1952, but only a small percentage used any preservative. Preservatives could have been used to good advantage in more cases.

The use of hay crop silage has increased rapidly, and as might be expected, not all silage could be rated as good. Poor-quality silage can be traced to one of two main causes—the material was ensiled when it was either too low or too high in moisture.

Preservatives Not Foolproof

Preservatives are often expected to insure good-quality silage regardless of the condition of the material ensiled. Preservatives will make possible a better-quality silage only when the moisture is higher than it should be in relation to the other conditions under which the material is ensiled.

When conditions are right, as palatable a silage may be made without a preservative as with a preservative.

No one can make a good silage when the moisture content is excessively high. There is always danger of a foul-smelling silage resulting when materials are put up with free moisture such as rain. But, in a normal season when the moisture runs 70 to 80 per cent in the harvested crop, the recommended amounts of preservatives will make a palatable silage.

Some preservatives have in themselves no feeding value. Other preservatives do contain nutrients that animals can use, but not all these nutrients are available after fermentation. In the fermentation process some 20 per cent of these nutrients is lost. In other words if 200 pounds of corn and cob meal per ton of green material is used and the cost of the meal is two cents per pound or four dollars a ton, only about $3.20 will be recoverable by livestock. Eighty cents will be spent in the attempt to have silage that smells and tastes good.

The preservatives most commonly used at present are ground grains—oats, barley, corn and cob meal, or molasses (either in liquid or dried form). But ground grains used with materials low in moisture may be harmful rather than helpful. They will further decrease the moisture content and cause more fermentation and greater loss of dry matter. Liquid molasses—usually diluted 1 to 4 with water—is not as easy to use, but is higher in sugar, pound for pound, than dried molasses and has been priced at less per 100 pounds.

Sulfur Dioxide Effective

Another preservative, sulfur dioxide, was used on a number of farms in the state last year. This is available in liquid form under pressure in 100 and 150 pound steel drums. Five pounds is recommended for each ton of green material. Sulfur dioxide is applied by probing each five foot of silage at spacings two feet apart around the silo. When correctly applied and the moisture is average for freshly cut material, the silage proves green in color with a pleasant odor.

Sulfur dioxide has no feeding value in itself. Experimental work done in Pennsylvania indicates that loss of dry matter due to fermentation may be decreased somewhere in the neighborhood of 10 per cent.

Another preservative not as yet tried in Minnesota is sodium metabisulfite. This comes in powder form and may be easily mixed with the green material in the blower. It has no feeding value in itself and acts in the same manner as sulfur dioxide.

Makers of hay crop silage are looking for a preservative that is cheap, easy to use, effective in cutting fermentation loss, and satisfactory for materials over a wide moisture range.

* Extension agronomist

Corn Contest Blanks Are Available Now

Farmers wishing to enter the Minnesota "X-tra yield" corn production contest may obtain entry blanks and assistance with plans for their plots from county agents, Harold E. Jones, extension soils specialist at the University of Minnesota, has announced.

The contest is being held in order to give recognition to farmers who demonstrate, by means of yields, the use of sound management practices in the production of corn.

Winners will receive trophies at a special banquet during Farm and Home Week on the St. Paul Campus of the University of Minnesota in January, 1954.

Filled-out entry blanks are due in county agents' offices no later than July 1.

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