Sulfa Drugs Tested

for control of coccidiosis, pullorum, typhoid and cholera in chickens

R. A. Bankowski

Sulfa drugs may not save chickens severely infected with cecal coccidiosis, but—properly administered—they will prevent losses in the rest of the flock.

Sulfa drugs act by destroying coccidial forms which are found in the ceca, but do not repair the tissue damage caused by the parasites.

At the first sign of an outbreak of cecal coccidiosis where only a few chickens show symptoms of the disease, the drugs can be used to an advantage to protect the remaining chickens in the flock.

All of the commonly known sulfa drugs act similarly but there is probably some difference in the degree of anticoccidial action.

Tests of 45 sulfonamides showed that only four were more active than sulfaguanidine. They were chlorodiazine and bromodiazine, which were 10 times as active; sulfamethazine and sulfapyrazine, which were four times as active as sulfaguanidine. Drugs such as sulfathiazole, sulfathalidine, sulfasuxadine, which are relatively nonabsorbed from the gastrointestinal tract of chickens were inferior to sulfaguanidine.

Recent Studies

Recent studies have determined how long the drug could be withheld following inoculation with coccidia and still be of some value in curtailing the disease process.

When the treatment was started one day before, at the same time, or one day after the birds were inoculated, the sulfaguanidine mash was highly effective in combatting the heavy infection. Some protection was evident when treatment was delayed until the second and third days after the birds were inoculated, but the action became much less effective as the time between inoculation and treatment was increased from four to six days after inoculation.

All treated groups—based on weight gains over a two-week period—fared better than nontreated inoculated birds.

This experiment shows the importance of starting treatment at the first sign of the disease in order to protect the majority of the flock before the parasites develop beyond the point where the sulfa drugs may be most effective.

Since coccidiosis is so nearly universally present on poultry farms, the objective in the control program is to immunize chickens to the effects of the parasites rather than to prevent them from picking up any parasites.

A certain number of coccidia must be present in the intestines in order to produce such an immunity. When the drug is given in too large amounts, the action on the coccidia is so great that too many of the parasites may be destroyed leaving no opportunity for the chickens to develop a resistance to the disease. Although the disease may be promptly arrested by a large dose of the sulfonamide, a second outbreak may occur a short time later.

When the amount of the drug used is too small, the quantity which finds its way into the ceca and the blood is insufficient to affect the large number of coccidia present, and the rapidly multiplying forms consequently will cause severe damage to the wall of the ceca, produce a severe form of the disease, or possibly cause death to the chickens.

With the sulfaguanidine it was fairly well established that 1% of the drug in the mash can be used to an advantage in most outbreaks. This dosage is sufficient to arrest the course of the disease and at the same time allow the chickens to develop an immunity to later infections.

The therapeutic doses of sulfamethazine and sulfamerazine, according to the available data, are given at the rate of 0.4% in the mash, and sulfaquinoxaline at the rate of 0.05%.

Sulfaguanidine often has been shown to be less toxic than sulfamethazine.

In applying the sulfa drugs to control an outbreak of cecal coccidiosis any of the sulfonamides—sulfamethazine, sulfamerazine or sulfaguanidine—can be used to an advantage. The drugs must be given for periods of at least 48 to 72 hours for maximum effectiveness in controlling the mortality in the early stages of the disease.

In an outbreak of coccidiosis in the field it can be assumed that all chickens in the flock do not become infected at the same time with the same number of coccidia.

Treatment to be of greatest benefit must be (1) started in the initial stages of an outbreak, (2) discontinued long enough to enable the still noninfected chickens to pick up enough parasites to become immunized, and (3) repeated for the benefit of those not infected when the prior treatment was given. Both theory and experience indicate that at least two, and possibly three, treatments with medicated mashes at four-day intervals should be given.

Although sulfamerazine and sulfamethazine have been shown to have greater anticoccidial action than sulfaguanidine, they are more toxic than sulfaguanidine, they have not been proved to be far superior to sulfaguanidine and the cost of either of the two drugs is three or four times as great as that of sulfaguanidine.

New Sulfas Tested

Two new drugs—sulfaquinoxaline and chlorodiazine—also are being tested against coccidiosis.

The most recent drug which is showing promise as a coccidiostatic agent is sulfaquinoxaline. It is claimed that this drug is effective against the intestinal as well as the cecal type of coccidiosis and can be administered in the feed for controlling acute outbreaks or given continuously in the mash as a preventive until the birds are past the age when coccidiosis is apt to appear.

The drug is still in the experimental stage and is not available commercially.

Sulfonamides have been used with some success to reduce mortality from pullorum disease, fowl typhoid and fowl cholera—three poultry diseases in which surviving birds may serve as carriers of the infection. All three of these infections have responded to one or more of the following drugs—sulfamerazine, sulfadiazine, sulfamethazine, and sulfaquinoxaline. For the most part the drugs were tried upon artificially infected chicks in a laboratory experiment or in natural outbreaks occurring in very young birds where treatment was instituted immediately after the infection was detected.

On the basis of these experiments it can be conjectured that chicks with advanced lesions caused by the organisms are less likely to be benefited by the drug and that large quantities of the drug would be necessary in the blood to reach the organisms that are harbored in the organs of the carriers.

Rapidly absorbed sulfa drugs, such as sulfamerazine, have a marked effect in reducing the mortality of artificially induced cases of fowl typhoid in chicks and poults.

Recently sulfamethazine and sulfaquinoxaline were compared as therapeutic agents in an acute outbreak of fowl cholera in turkeys. Both drugs were capable of checking the mortality. When the treatment was withdrawn and/or the birds placed on a new, thoroughly clean farm, the mortality reoccurred, showing that these drugs were not capable of re-

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2,4-D

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oil deposited was not influenced by the presence of 2,4-D.

Time of Application

Application of 2,4-D should be avoided from one month before bloom to one month after bloom and, of course, oil sprays usually are not applied during this period. When spraying lemons this caution may not be so important. In any case the established practices under local conditions with respect to timing, grade of oil, dosage, temperature, etc., should be followed, unless applications coincide with the bloom period.

Application of 2,4-D in oil even at the low concentration of four p.p.m. in the finished oil spray mixture may cause leaf curling when applied on young, actively growing shoots. Data thus far obtained indicate no decrease in fruit quality or production as a result of the curl. The leaf curl may be minimized by spraying with 2,4-D between leaf growth flushes.

The vigorous, rapidly growing whips or sucker-shoots of lemons are very sensitive to 2,4-D and may be killed at the tip by its application. Subsequent to the killing, however, these suckers have been observed to produce short lateral fruiting branches.

In orchard practice the tips of these suckers are often mechanically cut off to accomplish this same purpose.

There is no information available on the effect of two applications of 2,4-D per year. It is not anticipated difficulties would arise in this regard provided the bloom period were avoided.

Spray rigs previously used for 2,4-D weed spraying should be thoroughly cleaned before applying oil sprays on citrus. Flush the tank several times with a strong alkaline water solution—soda ash, etc.—and rinse with clean water. If the rig was previously used with weed-oil, and 2,4-D, rinse out the oil residue with kerosene or some similar petroleum solvent before using the alkali solution.

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AVOCADO

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Virtually every horticultural practice has been tried to correct the alternate bearing behavior of the Fuerte avocado variety. Among these are orchard fertilization, fruit-thinning and pruning.

Of all the practices tried, only one worked, but unfortunately it is not applicable to commercial practices.

That was very early harvesting—as soon as the fruit attains horticultural maturity—coupled with girdling. When these were done it was possible on individual limbs to produce two good crops in succession and to change the stride of alternation so that limbs on the same tree were in opposite stride.

Early harvesting without girdling did not accomplish the desired result.

The conclusion has been reached that there are really only two solutions to the problem of alternate bearing in the avocado.

One of them is finding strains or seedlings of Fuerte that are less subject to the factors that cause alternate bearing. Evidence exists that there are at least two strains and one that is somewhat better than the other has been isolated. The better strain seems to be less sensitive to unfavorable temperatures during the fruit-setting period, and its alternation is more regular and perhaps not quite so wide in amplitude as that of the other strain.

The other solution—upon which work was started several years ago—is the breeding of varieties that have the desirable market and other qualities of Fuerte but are less subject to the alternate bearing habit.

There is some hope in the picture because there are some varieties that don't alternate much. Perhaps by using them as parents in a breeding program their desirable characters in this respect can be converted to their progeny, and at the same time the desirable characters of Fuerte can be brought into the progeny. If so, the resulting product will be better than anything produced now.

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RATS

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only by a trained official. All of the gases used are poisonous to man and domestic animals.

Calcium cyanide is the commonest material used in gassing. It is available both in granular form and as a dust. The dust is applied with a special pump and a hose for insertion inside the burrow. Granular cyanide is applied directly inside the burrow.

Other gases which are effective include carbon disulfide, sulfur dioxide, and methyl bromide.

A simply administered gas is carbon monoxide from an automobile exhaust which can be forced through a hose into rat burrows. This gas may be used for burrows under cement farm buildings where cyanide would be dangerous to livestock.

Poisonous dusts are effective in some cases. ANTU—up to 20%—when mixed in flour, pyrophyllite, or talc, may be dusted heavily on rat runs and entrances to burrows for control of Norway rats.

In areas where murine typhus is a hazard, DDT dust—5% to 10%—is placed on runways to catch on the feet and fur of passing rats and kill many of their fleas. Any of these dusts can be applied with a sifter can.

When rat burrows are numerous in fields, the burrows may be destroyed by plowing to a depth of 18 inches with a subsoiler or chisel.

Rats may sometimes be killed by flooding their burrows, especially on poultry farms.

Since fleas and mites will leave dead rats and may get onto people, the trapper should handle dead rats as little as possible and should wear gloves.

Dead rats and mice should be burned out-of-doors, or buried at a depth of not less than two feet.

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SULFA

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moving the bacteria which were harbored in the organs of the birds.

Data concerning the effect of the sulfa drugs upon reactors and carriers indicate that the present drugs cannot be relied upon to remove carriers of organisms which cause fowl chlorea, pullorum and typhoid disease of poultry. At best the drugs may be used in acute outbreaks in the hope of salvaging as many birds as possible. It is strongly recommended, however, that the salvaged birds not be used as breeders.

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