The Effect of Sulfadiazine* on 
Eimeria acervulina Infection in 
Pullets in Egg Production**

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Several investigators have shown sulfadiazine to be an effective coccidiostatic agent against Eimeria tenella and Eimeria necatrix infections. This report deals with the effect of sulfadiazine against Eimeria acervulina infection in young pullets in egg production.

PROCEDURE

Sixty-five White Leghorn pullets were reared under controlled conditions to keep them free of coccidial infection. At about 10 weeks of age each bird was placed in an individual laying cage. When they were laying about 50 percent egg production they were divided into 5 lots of 13 birds each. An effort was made to make an equal distribution of the birds on the basis of body weight and the time of laying the first egg. Beginning at this period of lot designation the birds were weighed individually twice each week at 3 or 4 day intervals. The pullets were fed an all-mash ration which was supplemented with oyster shell, when egg production started.

All birds in Lots 1, 2, 3, and 4, were given a dose of approximately 10,000,000 sporulated E. acervulina oocysts when they were 185 days old. The coccidia were administered into the crop with a pipette. Chickens in Lot 5 were maintained as non-inoculated, non-treated controls. Seventy-two hours after the inoculation with coccidia the chickens in Lots 1, 2, and 3 were placed on treatment with sulfadiazine in the mash as follows: Lot 1 was given 0.015 percent sulfadiazine in the mash, Lot 2 was given 0.03 percent sulfadiazine in the mash, and Lot 3 was given 0.05 percent sulfadiazine in the mash, continuously for 7 days. Lot 4 was maintained as inoculated non-treated controls.

Nineteen days after the coccidia inoculation the pullets in Lot 4 had regained their body weight and egg production. At this time a challenge inoculation of approximately 20,000,000 sporulated E. acervulina oocysts was administered into the crops of all the pullets in Lots 1, 2, 3, 4, and 5. This was to test the immune response of the birds given the primary coccidia inoculation.

The criteria used to judge the effect of treatment was body weight and egg production. Examinations of the feces for oocysts was also used, although this was not on a carefully controlled critical basis.

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Observations of the character and quantity of the feces and a general effect on feed consumption was also taken into consideration.

RESULTS

At the end of the fourth day after inoculation the droppings from pullets in Lot 4 were becoming coated with slimy mucoid, catarrhal exudate. Droppings from pullets in Lots 1, 2, 3, and 5 showed no abnormal change. At the end of the fifth day after inoculation, pullets in Lot 4 were passing very slimy mucoid droppings and had very little appetite. The appetite and droppings of pullets in Lots 1, 2, 3, and 5 continued to be normal.

Composite samples of feces taken from birds in each lot were examined by centrifugation for oocysts. Samples were taken at the end of the 5th, 6th, 8th, and 9th days after inoculation and typical _E. acervulina_ oocysts were found in large numbers only from the pullets in Lot 4. Fecal samples from pullets in Lots 1, 2, 3, and 5 yielded no oocysts.

After the challenge inoculation, 19 days after the primary inoculation, composite

![Graph I](http://ps.oxfordjournals.org/)

GRAPH I.—Comparison of daily egg production of pullets treated with sulfaquinoxaline and untreated birds.
fecal samples taken from birds in each lot were again examined by centrifugation for oocysts. Samples were taken at the end of the 6th, 7th, and 9th days after challenge inoculation and typical *E. acervulina* oocysts were found in large numbers only from pullets in Lot 5. Fecal samples from pullets in Lots 1, 2, 3, and 4 each yielded a few typical *E. acervulina* oocyst per field examined. These data plus the egg production and body weight records clearly indicate that although there appeared to be complete suppression of oocysts development by sulfaquinoxaline in Lots 1, 2, and 3 there was sufficient coccidial development to create a practical protective immunity in these birds. Further, it indicates that the immune response is developed by first stage schizogony development of *E. acervulina* in the chicken. Cuckler and Ott (1947) report some effect of sulfaquinoxa-
line on the sporozoites and first generation schizonts of *E. tenella* but that the more complete coccidiostatic action is on the second generation merozoites. Farr and Wehr (1947) report that the coccidiostatic effect of sulfamethazine is chiefly against the second generation schizonts of *E. tenella*. The effect of sulfaquinoxaline on *E. acervulina* appears to be similar to that reported for *E. tenella*.

The most useful criteria for judging the practical effect of sulfaquinoxaline on *E. acervulina* is shown in graphs I and II which give the daily egg production and average body weight of the pullets in each lot. These data show very clearly the marked coccidiostatic effect of sulfaquinoxaline in all treated lots of pullets. Further, these graphs show the effect of the immunity from the primary coccidia inoculation when the challenge inoculation was given.

There was no mortality due to the coccidial infection. One pullet in Lot 3 died suddenly ten days after the primary coccidia inoculation. This was the seventh day of treatment with 0.05 percent sulfaquinoxaline. Gross lesions in the liver, spleen and kidneys were similar to those described by Delaplane (1948) for sulfaquinoxaline poisoning. One pullet in Lot 4 died eleven days after inoculation due to a persistent hemorrhage from the comb. Thirty-nine days after inoculation one pullet in Lot 5 died due to internal laying that resulted in a generalized peritonitis. This was the total mortality in the five lots during the trial period.

Unfortunately, the pullets in Lot 5 contracted Newcastle disease and started showing symptoms 33 days after the first coccidia inoculation. This explains the prolonged dip in egg production and average body weight that occurred in Lot 5 following the challenge inoculation. By rigid quarantine the Newcastle infection was confined only to the pen that housed Lot 5. No mortality occurred in this lot of birds as a direct result of either the coccidial infection or Newcastle disease. However, the reaction of either one or both of these diseases could have caused the reproductive failure that resulted in the death of one pullet in this lot 39 days after the first coccidial inoculation.

**SUMMARY**

In these trials sulfaquinoxaline gave an effective coccidiostatic action against an artificial infection of *E. acervulina* in laying pullets, when fed 72 hours after coccidial inoculation, in an all-mash ration for seven days at levels of 0.015, 0.03, and 0.05 percent.

The coccidiostatic action did not prevent the development of immunity although it did prevent the formation of oocysts.

The body weight and egg production were not noticeably affected in the birds fed sulfaquinoxaline at the levels indicated.

**REFERENCES**


Grumbles, L. C., and J. P. Delaplane, 1947. Sulf-

**News and Notes**

**ANNUAL MEETING—AUGUST 1-4, 1949**

The 38th Annual Meeting of Poultry Science Association was held at Ontario Agricultural College, Guelph, Ontario, Canada, August 1 to 4, 1949. The total attendance of members and guests, including those from the Ontario Veterinary and Agricultural Colleges, was 812; with 402 actively participating in the meetings. Attendance at the annual banquet was 630.

Officers elected for the Association year 1949–50 were:

President—W. M. Insko, Jr.
1st vice-president—W. R. Hinshaw
2nd vice-president—E. M. Funk
Secretary-treasurer—T. B. Avery
Directors—W. A. Maw, J. E. Parker, H. M. Scott, J. R. Cavers, O. E. Goff.

The duties of the retiring editor of Poultry Science were divided into two offices:

Editor—H. D. Branion
Business Manager—T. B. Avery, secretary-treasurer of the Association
P. D. Sturkie and T. H. Canfield were elected to the editorial board.

The 1950 Annual Meeting of the Association will be held at the University of Wisconsin. For the 1951 meeting the invitation of the University of Tennessee was accepted.

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