

# Infectious Bronchitis Control

immunization of chicks by willful infection protects laying hens from disease which may be costly to table egg producers

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*The following article is a report of progress in a long term field study conducted by the University of California. The laboratories of the California Department of Agriculture cooperated with counsel and by making determinations of disease conditions during these trials. Farm Advisors W. F. Rooney, Tulare County, Ralph Pfost, Fresno County, W. W. Mitchell, Sacramento County, and Dr. M. A. Nilson, acting extension poultry pathologist, helped plan and conduct the trials.*

**Infectious bronchitis** — IB — was first recognized in California as a disease of young chicks which occasionally caused high mortality but resulted in a lasting immunity in recovered birds.

There is considerable evidence that uncomplicated IB is not of major concern to fryer producers since it results in only minor or temporary setback in the growth of chicks. Death loss from IB has not been a serious problem. It is of greatest importance as an economic hazard to table egg producers.

In California, the greatest need has been to prevent outbreaks of bronchitis in laying hens because it is in this group of birds that economic loss due to disrupted egg production and lowered egg quality has been most severe. Birds that have not had the disease as chicks are still susceptible when they come into the laying period.

A state-wide survey in 1951 indicated that the disease was present in all major poultry producing areas and, while most

mature laying flocks were immune, many growing flocks were susceptible and needed protection.

## Willful Infection Trials

Field trials were started in 1952 to determine if a program of immunization by willful infection of the chicks before they began to lay would fill the need in California as a similar program has in many other states. In Massachusetts—the first state to use this plan—over three million pullets were immunized in 1953, by swabbing the windpipes of a small per cent of the birds with IB virus and allowing the infection to spread.

The California trials were organized on an area basis with the Orange Cove-Orosi area—in Fresno and Tulare counties—selected for the first series of experiments. Infectious bronchitis in laying chickens had been definitely diagnosed in that area. Most of the poultrymen produced table eggs and all the growers wanted information on immunization. Also, it is well isolated from other poultry areas by extensive fruit or field crop operations or by mountains with the prevailing winds toward the mountains. The number of birds involved were within the limits of practical field experimentation.

To determine the immunity status of

flocks in the area a challenge-test was done. Three to six representative birds—from each of several age groups on co-operating ranches—were shipped to Davis. Each bird was inoculated intratracheally—in the windpipe—with IB virus as illustrated by the photograph. If the birds were immune, no symptoms developed. If they had not had bronchitis and were not immune, there would be a take. That is, the birds would sneeze, gurgle or cough.

All replacement chicks on ranches where the adult layers were immune were willfully infected—immunized—with IB virus.

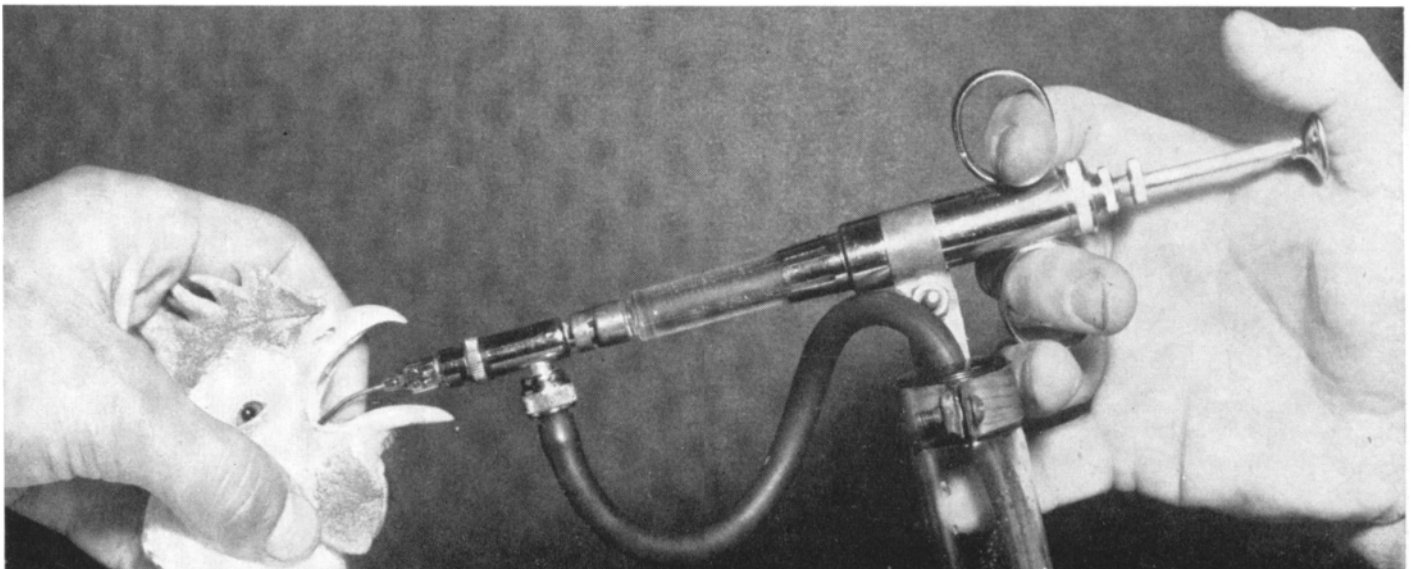
Detailed records were kept for two weeks and general effects were noted for the duration of the trial.

To determine if the immunity induced was satisfactory to prevent a drop in egg production certain growers submitted their flocks to IB challenge on the ranch a year later.

In 1952 there were 87 age groups of chickens—from 34 flocks—tested for immunity to bronchitis by challenge. Based on the challenge-test results, 62 groups were immune, nine were not immune, and 16 were questionable—where one or two birds in the test group developed bronchitis—had takes—while the other chickens did not.

Because of the number of questionable

**Inoculation of chick with infectious bronchitis virus. A few drops of the virus fluid are squirted into the windpipe.**



groups, it was decided to inoculate intratracheally all of the growing chicks—before 14 weeks of age—in each brood of laying bird replacements to be immunized. This 100% inoculation was done to insure that each chick would become infected and develop immunity.

Challenge of laying flocks which as chicks had gone through a natural outbreak—as well as those inoculated 100% in the trial—indicated that good protection was obtained through at least a year.

To conserve time and costs it was decided in 1953 to test the practicability of inoculating 10% of each brood and allowing the infection to spread to penmates, thus inducing immunity throughout the brood or group. As was the case in previous years, such flocks showed no drop in production or any adverse effects when challenged—on the ranch—11 months after this type of immunization.

### Rio Linda Area

Following the satisfactory results in Orange Cove-Orosi, poultrymen in the more intensive poultry area of Rio Linda offered their cooperation to obtain extensive data.

The Rio Linda area was organized along lines similar to those of Orange Cove-Orosi. The assistance of veterinary practitioners in each area was enlisted to do the immunization. To coordinate the trials, a steering committee of poultrymen was formed in each area. Only 10% of the birds were actually inoculated in each of the broods to be immunized.

A survey by challenge of the laying flocks to be included in the Rio Linda area showed that all were immune. Thus the trial and inoculation could go ahead without endangering any susceptible laying flocks. Cooperating flock owners could have groups of replacement chickens challenged by veterinarians to determine the immunity status. If a group proved to be resistant to IB—as a result of a natural outbreak—inoculation was not done. Thus, there were more flocks in the trials than are shown in the table because broods immune on challenge—therefore not inoculated—are not shown.

### Results of All Trials

The over-all mortality from all causes for the two weeks following willful infection was about 1%; the range was between 0% and 8.5%. Chicks in 86.8% of all flocks inoculated developed symptoms while in the remainder there were no takes.

A careful check revealed that concurrent infections—Newcastle Disease, chronic respiratory disease, or others—were present in many of the broods where mortality following immunization exceeded 1% to 1½%. In some broods,

poor management or brooder failure contributed to high mortality.

On-the-ranch challenge of the laying hens—9–12 months after their inoculation as chicks—showed that the immunity induced provided adequate protection during the following laying year; challenge did not affect egg production or quality. Similarly, field outbreaks of definitely diagnosed bronchitis resulted in satisfactory protection as shown by later challenge of such flocks except that in one such case there was a very slight drop in production.

The lowest mortality reported in the trials—0.0% for the two weeks following inoculation—occurred in chicks inoculated 100% at two weeks of age and with good takes. However, there is a definite indication from the data that the mortality from all causes for the two week period following inoculation was much lower in chicks inoculated at five weeks of age or older than in chicks inoculated at three to four weeks of age. It was also obvious that IB virus should be used only on growing birds in good health. Its use on chicks infected with other agents may precipitate increased losses.

Where all chicks in a brood were inoculated directly into the windpipes, the symptoms occurred within 24–48 hours and were over within a week or ten days except where prolonged by complicating respiratory infections. When only 10%–20% of the brood were similarly treated and the infection allowed to spread, the beginning of marked signs occurred a little later and the duration of the outbreak spread out over a longer period.

Results of the trials indicate that under the conditions encountered in the two test areas willful exposure of 100%—or of 10% of the birds in replacement flocks—by inoculation with Massachusetts L-43 strain of infectious bronchitis virus provides adequate protection during the first year of production. The procedure as carried out proved economical and practical. It was not considered to harm the welfare or income of the few fryer producers operating within the trial areas.

These trials were begun before any commercial IB vaccines were available and—as of May 1, 1955—no effective immunizing strain of infectious bronchitis virus is available which does not cause symptoms following its use on susceptible birds or which does not spread from the vaccinates to susceptible birds nearby.

### Satisfactory Control

The data obtained from over 315,000 chicks in broods with takes indicate that the Massachusetts L-43 strain of IB virus used in the trials by veterinarians on an area basis—after the immune state of all flocks had been determined—provided satisfactory control of infectious bronchitis in laying hens. The cooperating poultrymen were thus protected against economic loss.

It must be emphasized that this method of immunization is not without hazard, since the virus spreads—as do other symptom-producing IB viruses—to susceptible birds in the area. It should therefore be used only under carefully controlled conditions.

The goal must be to find vaccines and methods which produce immunity—without perpetuating the disease—with a view toward its elimination. Research is continuing on this and other infectious bronchitis virus strains as immunizing agents.

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*The strain of infectious bronchitis virus used for both challenge and inoculation and designated Massachusetts L-43 was obtained from Dr. Henry Van Roekel of the University of Massachusetts. Since October 1953 the virus used was prepared and donated for the trials by the Cutter Laboratories, Berkeley. Prior to that time the virus was prepared in University of California laboratories at Davis.*

*The poultrymen in both areas and Drs. Ian McDonald, Jack Pflock, and S. F. Exstrom cooperated in the trials reported.*

### Results of Willful Infection Trials

Trial	Totals inoculated				Flocks with takes			
	Flocks	Birds	Mortality 2 wk. post inoc.	%	Flocks	Birds	Mortality 2 wk. post inoc.	%
100% . . . . . Orange Cove-Orosi 1952-1953	77	84,505	911	1.08%	69	77,355	851	1.10%
10% . . . . . Orange Cove-Orosi 1953-1955	59	64,110	401	0.63	46	50,090	383	0.77
10-20% . . . . . Rio Linda 1953-1954	89	213,726	2,735	1.28	78	188,820	2,452	1.29
<b>Totals . . . . .</b>	<b>225</b>	<b>362,341</b>	<b>4,047</b>	<b>1.12%</b>	<b>193</b>	<b>316,265</b>	<b>3,686</b>	<b>1.16%</b>