

PE in Poultry

variety of factors found to affect control of avian pneumoencephalitis

J. R. Beach

The virus of PE—avian pneumoencephalitis, pneumo or Newcastle disease—recently was isolated from the air of a poultry house containing an infected flock.

Normal chickens became infected with PE when confined in cages in the poultry house in such a way that they were out of contact with any contaminated material which was not air-borne.

Such demonstration of the virus in the air makes it appear possible that air-borne transmission is largely responsible for the rapid spread of the disease throughout a house, from house to house, or from farm to farm.

Possible transmission of the disease through eggs also has been demonstrated.

Present evidence indicates that such transmission is likely to occur only in the case of eggs laid when a flock is actively infected—not after full recovery. It also indicates that eggs containing virus are just as likely to fail to hatch because of infertility or dead germs as they are to hatch infected chicks.

Some Characteristics of PE

PE occurs in chickens, turkeys, and several other species of birds—pheasants, partridges, quail, doves, and pigeons have been proved susceptible by inoculation with virus.

In California the disease has tended to be less prevalent and, on the average, less severe in turkeys than in chickens, even in areas in which large numbers of both are raised.

Flocks of any age may become infected.

The amount of damage which an infected flock may suffer is entirely unpredictable. Numerous instances of flocks being affected with an inapparent or sub-clinical form which causes no visible symptoms of loss, have been detected.

This is an insidious character which makes it difficult to know just how widespread the disease may be.

Nearly all birds of affected flocks become sick but the death loss may vary from none to all, to half or more of a flock. Wide variation in the severity of the disease is often seen among different pens of birds of the same age. The average mortality in affected flocks of chicks is probably about 10% and a little less in laying flocks.

In some areas PE is most prevalent among chicks and in others it is laying pullet flocks that are most frequently attacked.

When PE occurs it is likely to progress through all susceptible groups on the farm but some may escape. On many farms the disease has recurred in each year's crop of replacement stock.

There are known instances of a farm not located in a congested poultry district being free of the disease for several years after an outbreak. A recovered flock is considered immune for life. No reports of a second outbreak of PE in the same group have, to the writer's knowledge, been definitely verified.

Two attacks of a respiratory trouble which looked alike but were from different causes could easily be mistaken for the same disease because it is impossible to differentiate the respiratory type of PE from certain other respiratory diseases by symptoms and lesions alone.

Outbreaks in chicks usually start as a respiratory difficulty manifested by coughing and gasping.

The flock, except for diminished appetite and some droopiness, may not be otherwise affected and will recover in two or three weeks with little or no death loss. In the majority of outbreaks, however, nervous symptoms are soon seen in some of the birds.

The nervous symptoms are varied and include staggering, paralysis and twitching of legs or wings, twisting of the neck, etc. The number of such cases varies from a few to a large percentage and these are practically the only birds which are lost.

Laying flocks may show only a moder-

ate amount of coughing, decrease in appetite and a progressive drop in egg production for a week or two. The flocks then improve rapidly and within a month may be back to normal without any loss other than from the decrease in egg yield which occurred.

In more severe outbreaks marked droopiness may be general in the flock for a few days and floor or yard eggs with soft or imperfect shells are laid. Flocks thus affected may recover rapidly without serious death loss. On the other hand, nervous symptoms may appear in variable numbers of the birds. Mortality, as with chicks, is largely confined to birds with nervous symptoms.

Definite recognition of a disease as PE without the use of laboratory procedures is usually difficult and often impossible because the symptoms of respiratory trouble which are predominant cannot be distinguished from those of other respiratory diseases.

Lesions which are characteristic of PE are seldom seen in the organs of dead birds.

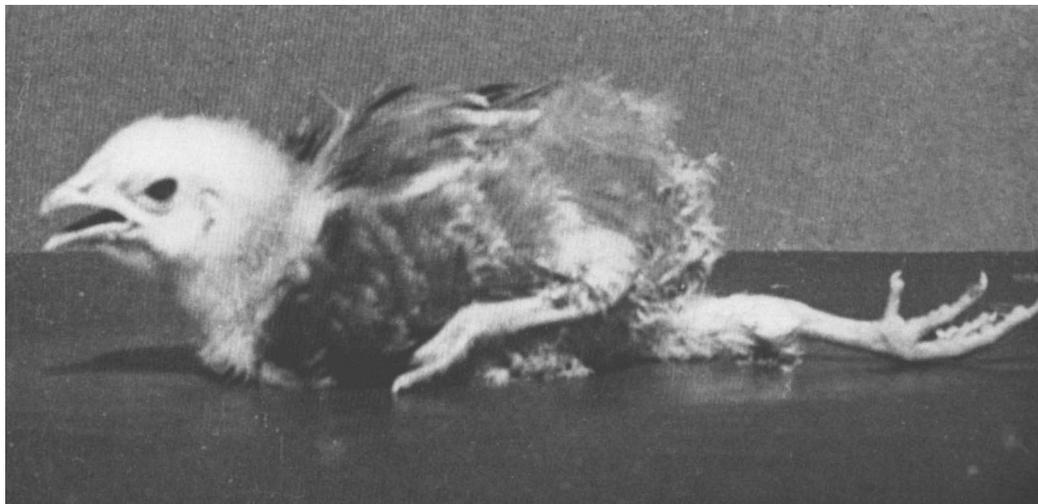
It is only when, in addition to respiratory symptoms, some birds of a flock of either chicks or layers develop nervous symptoms like those described that one can with reasonable assurance make a diagnosis of PE. Consequently, if one wishes to definitely know what disease he is dealing with, specimens should be taken to one of the several diagnostic laboratories in the State.

The laboratory procedures that can be used are (1) attempt to isolate the virus by inoculation of embryos with tissues of the affected bird, (2) tests of the blood of birds which have been sick for a few days or have recovered, and (3) tests of recovered birds for immunity to PE by inoculating them with virus grown in embryos.

The procedure most commonly used because it can be done more quickly than the others is a blood test known as the hemagglutination-inhibition or HI test. This can be completed within a few hours while the others require days to complete.

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The paralyzed legs of this chick are a nervous symptom of PE.



SPRAYING

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very large trees where a larger volume of air is required.

The principle of displacing the air in the tree area by the air delivered from

Dilution of Spray Chemicals Used in Bulk and Low Volume Sprays

Spray compound	Amount per 100 gallons	
	Bulk spray	Low volume spray
Oil emulsion.....	5 gals.	8.0 gals.
Emulsive oil.....	4 gals.	6.5 gals.
Lime sulfur solution.....	3 gals.	4.0 gals.
Wettable sulfur.....	4 pounds	6.0 pounds
Neutral copper.....	1 pound	2.0 pounds
DDT-wettable.....	2 pounds	3.0 pounds

the equipment shows the necessity for a large volume of air. Without sufficient air volume the rate of travel of the equipment is too low to be practical.

Directional Control

The spray pattern of the liquid discharge from this type of equipment is important. In order to obtain adequate deposits in the tops of the trees it is necessary not only to have directional control of the air stream but also of the spray discharge. The shape of the spray pattern may be changed from a semicircular form to that not unlike the forewings of a butterfly by diverting more of the air stream in the direction of the tops of the trees. This is done by means of deflectors placed in the cowling of the fan housing.

Directional control of the spray discharge is obtained by the proper arrangement of the spray nozzles. More nozzles are placed in the air stream directed at the tops of the trees and less nozzles in the air stream going to the lower limbs.

Number of Trees Sprayed at Various Rates of Travel in Low Volume Spraying

Miles per hour	Feet per minute	Number of tree spaces passed with trees spaced				
		18 ft.	20 ft.	22 ft.	24 ft.	26 ft.
1.0	88	5.5	4.4	4.0	3.7	3.4
1.5	132	7.3	6.6	6.0	5.5	5.0
2.0	176	9.8	8.8	8.0	7.3	6.8
2.5	220	12.2	11.0	10.0	9.1	8.5

Field experience has shown that a better distribution of the spray liquid in the air stream and a more desirable range of droplet sizes are obtained either with nozzles giving a fan-shaped pattern or a cone-shaped pattern than is obtained with spray jets. There is also the added advantage that these two types of nozzles are less apt to clog and are more readily cleaned than the jet type.

The droplet size must not be too fine or the deposits will be less. Coarse droplets tend to increase run-off.

Preliminary studies indicate that a droplet size range of from 30 to 100 microns in diameter gave very satisfactory deposits.

Advantages

In low volume spraying the problem of transporting large volumes of water is greatly reduced as the gallonage applied per tree is much less and the saving in cost of materials per acre—by preventing run-off of the spray liquid—is from 50 to 90% of bulk spraying. Added to this is the additional saving in time and equipment needed in refilling.

With the development of more air-carrier types of equipment and the use of the low-volume method of application the spraying of deciduous fruit trees promises to be much more efficient and economical than is the present practice of bulk spray applications.

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POULTRY

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A positive reaction to the HI test is reliable evidence that the bird tested has been infected with PE. A bird will continue to react positively for a long time after recovery.

If a flock has had two attacks of respiratory disease and specimens were not submitted for laboratory examination until the second attack, a positive reaction to the HI test at that time would not reveal whether the first or second attack was due to PE. Conversely, if PE was diagnosed when the first outbreak occurred, the HI test would be of no value in identifying the disease responsible for the second attack.

This feature of the HI test is probably responsible for some of the mistaken beliefs that PE has occurred twice in the same birds.

The PE vaccine which has been available for the past few years is prepared from infected embryos with formalin added to kill the virus. This vaccine is incapable of producing the disease and can be safely used on any farm.



NEW PUBLICATIONS

A copy of the publications listed here may be obtained without charge from the local office of the Farm Advisor or by addressing a request to Publications Office, College of Agriculture, University of California, Berkeley 4, California.

New Grape Varieties

RUBY CABERNET AND EMERALD RIESLING, by H. P. Olmo. *Bul. 704, May, 1948. (12 pages.)*

PERLETTE AND DELIGHT, by H. P. Olmo. *Bul. 705, May, 1948. (6 pages.)*

SCARLET, by H. P. Olmo. *Bul. 706, May, 1948. (6 pages.)*

Tomato Pests

CONTROLLING COMMON PESTS ON TOMATO IN NORTHERN CALIFORNIA, by A. E. Michelbacher, W. W. Middlekauff, and N. B. Ahesson. *Cir. 384, April, 1948. (15 pages.)*

Breeding Turkeys

SELECTING TURKEYS FOR BREEDING IMPROVEMENT, by W. E. Newlon and V. S. Asmundson. *Ext. Cir. 143, April, 1948. (15 pages.)*

Extensive field trials of such vaccine in which only a part of the flocks were vaccinated have shown that it does not give complete immunity against natural infection. Nearly all of these flocks became infected in six months or less subsequent to vaccination.

The loss from both mortality and decreased egg production among the vaccinated birds was enough less than among the nonvaccinated, that the flock owners considered vaccination worthwhile.

Much experimental effort has been directed toward developing live-virus vaccine which will produce complete and lasting immunity. The progress that has been made indicates that this objective will be accomplished in the reasonably near future.

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DONATIONS FOR AGRICULTURAL RESEARCH

Gifts to the University of California for research by the College of Agriculture, accepted in April, 1948

BERKELEY

Carbide and Carbon Chemicals Corp.....	\$2,400.00
Studies on ethylene oxide and other epoxides.	
Division of Food Technology	
Corn Industries Research Foundation.....	\$7,000.00
Studies in the chemistry of starch and other carbohydrates.	
Division of Plant Nutrition	
Sugar Research Foundation, Inc.....	\$910.00
Division of Plant Nutrition	