

California Poultry Letter

SEPTEMBER 1996

THE DYNAMICS OF AN INFECTIOUS CORYZA OUTBREAK

The effects of disease may be seen as clinical symptoms, subnormal performance, and reduced flock profitability. The severity of performance losses is often masked as the disease progresses through the flock - not all birds contract the disease at the same time. A small to moderate overall performance depression is seen, but individual rows or areas within the house may suffer a much more serious depression of performance. Effects are more prolonged with a slow moving disease and treatment becomes more difficult as individual areas of the house are in different stages of the problem. If a sharp loss in production occurs, this indicates we're dealing either with a very rapidly spreading disease or some totally different factor which affects the entire flock simultaneously.

In a recent nutrition experiment being conducted on a California farm, Infectious Coryza symptoms were observed in the test flock at about 25 weeks of age. The test house consisted of 96 short rows extending 500 feet from west to east. Each row had 140 birds which were fed different feeds and the flock consisted of 3 different popular White Leghorn strains. For experimental purposes, the test rows were subdivided into 4 separate blocks (west to east) with all feeds and strains randomly represented within each block. Symptoms of Coryza were first seen in the westerly most portion of the house and then progressively down the 500 ft. length of the test house over a period of 2 weeks.

Differences in egg production rates by strain

Figure 1 depicts the effect of Coryza on hen-day egg production. The exposure to the disease was the same for all strains, but its effect on egg production varied considerably between strains. For example, hen-day egg production rates in strains A & B dropped from 87% in the 27th week to 66% and 71% respectively (in the 30th week) compared to 44% for strain C.

Why do different strains react differently to the same stress? I'm sure the breeder would tell us that their birds are genetically superior to other strains in their ability to withstand various stresses or that they are not susceptible to different diseases. This may be so, but what appeared to influence egg production rates in this experiment was probably the **significant differences in feed consumption and therefore, daily nutrient intake**. Overall feed intake during weeks 27-30 dropped from 92.7 grams of feed per day to only 82.8 grams. Individual strains were affected differently (A: 83.8 grams, B: 91.4 grams, C: 73.2 grams). In general, flocks at this stage of egg production normally require at least 18 grams of protein per day - several of the treatment groups averaged less than 12 grams of protein per day for the entire 4 week period. Strain C consumed only 13.6 grams of protein per day - obviously contributing to their very low egg production rate during this period. Note: these data represent the entire test (all blocks).

The progression of the disease through the house

Figure 2 illustrates the movement of the disease through the four blocks of birds as evidenced by sequential drops in egg production. The birds in the 4th block appeared to show egg production drops 2 weeks after the birds in the 1st block. This delay could vary with the disease, the pathogenicity of the disease, the nature of air flow within the house and the amount of "traffic" between areas. The first effect on egg production appeared in week 26 in block 1 and by week 35, all blocks had returned to their projected "normal" egg production rate. Egg production by week 36 had exceeded the projected levels. Egg losses averaged 7.3 eggs per hen with 8.2 eggs lost in block 1 - the first area to get the disease. The remaining 3 blocks lost 6.9 to 7.1 eggs.

What was the sequence of performance problems?

Clinical symptoms occurred first followed by reduced feed consumption. Egg production then dropped over a three week period with recovery requiring another 6 weeks. Mortality began to increase about the time the flock reached its lowest egg production level and continued for about 4 weeks at a fairly high rate (.28-.54% per week). By 34 weeks, mortality had returned to normal.

Overall feed consumption reacted erratically during the course of the outbreak, but the lowest intake level occurred during week 28 with only 63 grams (13.9 lbs/100 hens) of feed consumed per hen. Note: this refers to block 1 only and for all strains combined. The lowest egg production rate in block 1 **occurred** one week after the lowest feed consumption. This level, representing all 3 strains, was 58.7%. See table 1.

Mortality reached its peak during weeks 30-33. Total mortality for the 4 week period reached 1.6% - about seven times the level seen in weeks 26-29. The total mortality experienced by the different strains was completely different, but the increase in rate was similar.

What was the economic cost of the outbreak?

Overall, the flock produced 7.3 fewer eggs than expected, had 1% fewer hens for the remainder of the cycle, and used 10 grams per hen less feed during 56 days of the disease. Considering all of these factors, it was estimated that the flock had lost 28C per hen housed.

(A more detailed report on this subject is available from the author)

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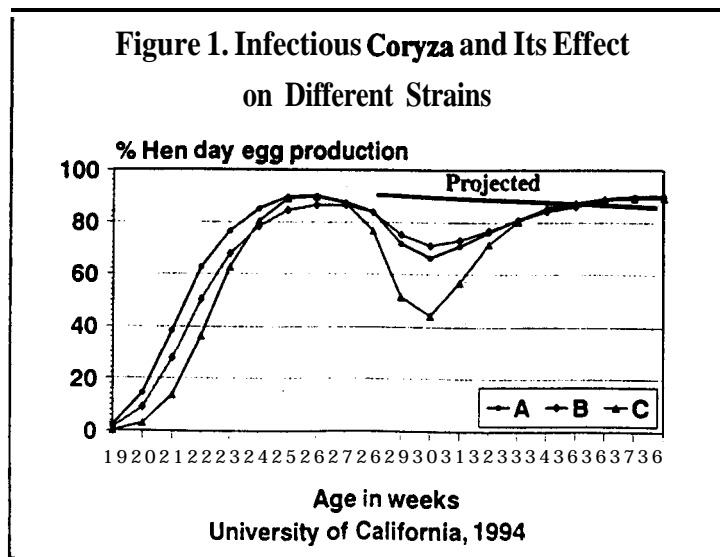


Figure 2. The Effect of Infectious Coryza as It Moves Across a Flock

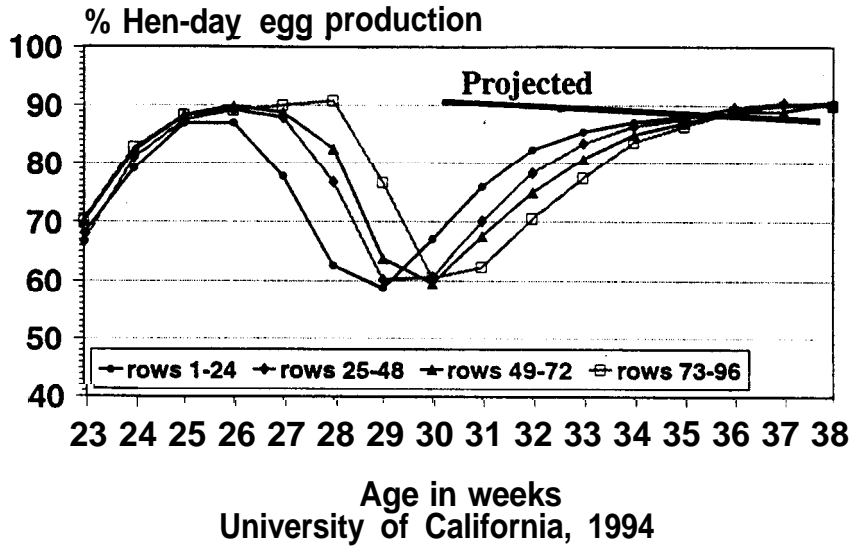


Table 1. The Sequence of Events in an Infectious Coryza Outbreak

Age (weeks)	Daily Feed Consumption (g)	Egg production (%)	Mortality (%)
25 *	91	86.9	0.28
26	77	87	0.14
27	99	77.7	0.21
28	<u>63</u>	62.6	0.14
29	89	<u>58.7</u>	0.07
30	76	67.1	0.39
31	107	75.9	0.28
32	105	82.3	0.39
33	116	85.4	<u>0.54</u>
34	91	87.1	0.25
35	124	88.1	0.25

* indicates first visible symptoms, underlines indicate the lowest feed consumption and egg production and highest mortality.

BROILER DENSITY

The ideal density at which broilers should be grown for optimum efficiency is difficult to determine. So many factors are involved, such as time of year, housing type, equipment, nutrition, size of bird, breed of bird, market needs, economic return, etc., that it is virtually impossible to say what density is best. The purpose of this tip is not to attempt to answer the question of what density is ideal but to emphasize how important it is for broiler producers to manage their houses and birds to minimize the possibility of production losses due to overcrowding.

Poultry scientists have conducted research on the effects of density on broiler performance for decades, but just in case there is any question about the effect of density on broiler performance, let's look at the results of a recently published study (Bilgili and Hess, 1995). This study was conducted during the summer under warm temperature conditions using modern, high yielding, male broilers that were grown to 49 days of age at densities of 0.8, 0.9, or 1.0 square foot per bird. Body weight, feed conversion, mortality, grade, and yield were measured. In this study, body weight, feed

conversion, mortality, carcass scratches, and breast yield were all clearly affected by broiler density (see Table 1).

This study suggests that the modern bird is very sensitive to crowding. The experienced broiler producer already knows that today's bird is much less forgiving in the broiler house than the bird of 10 to 20 years ago. This "less forgiving" characteristic may apply to density as well.

Although the results of this study are interesting and useful, they do not answer the tough question of what broiler density is best. Broiler producers and broiler companies cannot afford to have broiler houses stocked at 1.0 square foot per bird. Economics dictate that enough birds must be placed to optimize the pounds of liveweight produced per square foot, even if that means that average bird weight, feed conversion, and other performance measurements may suffer slightly.

Although stocking densities are set by balancing economics and performance, broiler producers do have control over many important factors that are related to density. Here are five management suggestions that may help producers get the most from the floor space they have available.

Table 1. Performance results associated with different bird densities (floor space)

Density	Body Weight (lb)	Feed Conversion	Mortality % (1-21 days)	Scratches %	Breast Fillet Yield % of Liveweight
0.8 ft ² /bird	5.77 ^b	1.88 ["]	3.60 ["]	14.4 ^{ab}	13.5 ^b
0.9 ft ² /bird	5.88 ^{ab}	1.85 ^b	2.10 ^b	17.6 ["]	13.9 ["]
1.0 ft ² /bird	5.99 ["]	1.83 ^b	2.00 ^b	11.0 ^b	14.0 ["]

Means within a column with different superscripts are significantly different ($P < .05$)

Density Related Management Tips

1. Probably the most important factors affecting performance when broilers are placed at high density are adequate feed and waterer space. All feeder and waterers must be kept in top working order with proper feed height, nipple height, and water pressure. Air locks in nipple systems can result in water space being severely limited, and thus must be avoided.

2. Strive to maintain consistent air quality and house temperature during cool weather. Cold spots along sidewalls can cause broilers to crowd into the center of the house and significantly reduce floor space. Air inlets that allow fresh air to be brought in and mixed effectively are highly recommended.

3. During warm weather, adequate air exchange and air movement to prevent heat build up is critical. High densities really make it difficult to remove heat from around today's big, heat sensitive birds. Furthermore, the modern bird just refuses to eat and gain weight in warm temperatures and must be cooled sufficiently to take advantage of its growth potential.

4. During warm weather, fences must be installed early in the flock cycle to prevent or minimize migration. Care must be taken to insure that equal numbers of birds are contained in each house section. It is recommended that migration fences be installed across the house every 100 feet down the length of the house.

5: It makes no sense to allow cull birds to take away valuable space from healthy, productive birds. Sick and seriously disabled birds need to be removed from the flock, not only to provide more space, but also to minimize the possibility of disease transmission.

In summary, be aware that floor, feeder and waterer space can significantly influence the performance of your broiler flock. Do all that you can to make sure your birds are able to effectively utilize every square inch of your house, feeding system and water system.

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THE VALUE OF ROUTINE NECROPSIES OF FRESH DEAD LAYERS OR PULLETS

(The following article by Dr. Eric Gingerich appeared originally in the June 24, 1996 issue of the DEKALB management newsletter. We think it is especially well written and to the point).

Early detection of disease, nutritional, or management problems is the key to reducing losses due to problems of this nature. An increasing number of progressive egg producers routinely perform necropsies of the fresh dead as often as once a week to aid in their management decision making processes.

To start a routine necropsy program, only one person should be designated to perform the necropsies, trained by a qualified veterinary pathologist, and assigned to this task on a specific time schedule. Use of a standard record form aids in taking and evaluating the data. A good, sharp pair of necropsy shears is also an essential item.

The following is a list of many of the types of problems which can be detected early, typical lesions, and management considerations to correct them:

1). Calcium depletion (soft bones)

Dead birds will show bent keels, beaded or collapsed ribs, and easily broken femurs at the femoral head. An evaluation of the calcium, phosphorus, and vitamin **D₃** nutrition is suggested. Therapy is normally vitamin **D₃** in the water with extra calcium in the feed.

2). Urolithiasis/ visceral gout

Symptoms include swollen kidneys, kidney tissue which has regressed, and urate deposits over the visceral organs (heart, liver, etc.). Evaluate calcium and phosphorus nutrition, infectious bronchitis vaccination schedule, and water availability. There are no good therapies.

3). Colibacillosis

Peritonitis with cheesy exudate is normally found. Antibiotic therapy, water sanitation, dust reduction, and reduction of Mycoplasma involvement (if present) should be considered. For long term prevention or control of Mycoplasma infections and viral respiratory infections, routine water sanitation and ammonia control need to be considered.

4). Tumors (normally Marek's Disease)

Tumors are found in the sciatic nerves (pullets) or visceral organs (pullets and layers). No therapy is available. Prevent through increased sanitation of pullet units, isolation from Marek's shedder birds, and use of more potent Marek's vaccines.

5). Small birds, regressive ovaries

The birds will be smaller than the average with regressing or inactive ovaries and may have a sterile, yolk peritonitis. These losses may be due to poor quality beak trimming, excessive nutrient intake restriction (feeding times, feed depth, too low density ration,

poor feed quality, or excess use of intermittent lighting). Treat and prevent by altering or eliminating the initial causes.

6). Tracheal oluas due to either avian pox or infectious larvnaotracheitis (ILT)

The trachea will have a plug of exudate at the larynx. Differentiation between ILT and pox must be made either by virus detection or histopathology at a diagnostic lab. Treatment is by vaccination if the losses justify the cost.

7). Coccidiosis

Usually in fresh dead, Eimeria necatrix or E. tenella are found as these two species will cause mortality. Treatment is to add amprolium to the water. Prevent by reducing exposure to oocysts and manure.

M. i t e s

These small, black insects will be seen crawling on the skin around the vent or crop areas. Treatment is the use of insecticides sprayed or fogged on the birds. Routine checks of live birds in several areas of the house is a better method of detection as mites leave the dead birds soon after death.

9). Peckout/ prolapse

The oviduct and other internal organs may be externalized and blood will be seen around the vent area. This problem is associated with excessive egg size, inadequate beak trimming, low nutrient intake, excessive light intensity, or crowding. Treatment is to correct the causative factors.

10). Fatty liver svndrome

The birds are usually heavier than normal with livers that are enlarged and yellow.

Rupture of the liver will show blood in the abdominal cavity. This is caused by an imbalance of energy intake and is treated by increasing non-energy nutrient intake, decreasing energy intake, and adding extra choline chloride in the feed.

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EGG QUALITY CHANGES DURING THE FIRST FEW DAYS OF A MOLT

Most induced molts are initiated with a feed removal period. Egg production begins to decline almost immediately and generally reaches zero by day 5 or 6. During this period, thin egg shells are the most noticeable quality effect and this problem results in the almost total diversion of eggs to the breaker after the first day.

In 1989, we measured egg quality traits for the first three days of the molt with three different strains of chickens. All strains showed a significant improvement in albumen height on the first day after removal, a peak on the second day and a slight decline on the third day. Haugh units followed a similar pattern.

<u>Measurement</u>	<u>Albumen Height (mm)</u>	<u>Haugh Units</u>
Initial	6.1	74.7
+1 day	7.0	81.1
+2 days	7.5	85.0
+3 days	7.1	82.9

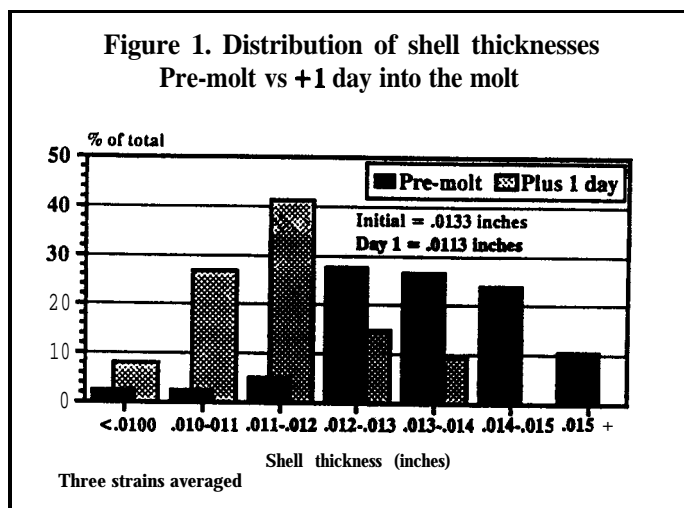
Shell thickness decreased by 15% on the very first day and remained at that thickness for the remaining two days. Shell smoothness, on the other hand, improved on day one and continued to improve on day two. Eggs on day three were slightly rougher than on day two.

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<u>Measurement</u>	<u>Shell Thick. (In.)</u>	<u>Shell Score*</u>
Initial	.01334	.87
+1 day	.01127	.79
+2 days	.01096	.33
+3 days	.01110	.48

* 0 = smooth, 3 = very rough

The shell thickness changes result in a significant increase in egg breakage almost immediately. Figure 1 illustrates the variability of shell thickness for the initial (pre-molt) and day one measurements.



Earlier research has shown that a significant lessening of this problem is possible when oyster shell or a similar substance is available at the time of feed removal. Whether or not this procedure is used will depend upon the feeding system employed and whether it can handle a material like oyster shell. Cost versus the loss in egg value associated with more cracked eggs for a couple of days must also be considered.

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