

Pa.'s Egg Quality Programs Go Nationwide

David J. Henzler, D.V.M.,
Marlin Henninger, and
Phil DeBok, M.P.H., D.V.M.
Pa. Dept. of Ag

The Pennsylvania Egg Quality Assurance Program (PEQAP) is a voluntary industry program intended to minimize Salmonella enteritidis contamination of chicken eggs. Preventive measures include placement of S. enteritidis clean chicks, intensive rodent control, cleaning and disinfecting between flocks, and comprehensive environmental monitoring of pullet and layer houses with continuous testing of eggs from any environmentally positive houses. Positive eggs are diverted for pasteurization or hard cooking. The Pennsylvania Department of Health provides technical advice regarding public health implications. The University of Pennsylvania, New Bolton Center, and Penn State University assist in culturing of samples and oversight.

Egg quality assurance programs will likely soon be mandated by FDA, USDA and other government agencies as directed by the Egg Safety Action Plan

(December 1999) as part of the President's Food Safety Council. Indeed, this plan presently calls for a 50 percent reduction of human SE cases by 2005 from eggs and related egg dishes. The extended goal is to eliminate SE illnesses associated with eggs by 2010. Quality assurance programs implementing risk reduction practices have achieved success as measured by statistics representing over 1100 commercial egg flocks in the Pennsylvania Egg Quality Assurance Program (PEQAP) monitored over a five year period (1994 to 1999). Furthermore well constructed HACCP plans which embrace significant findings associated with the Pennsylvania SE Pilot Project (1992 to 1994), PEQAP, the New England Salmonella enteritidis Control and Reduction Program, the California Egg Quality Assurance Program, the South Carolina Egg Quality Assurance Plan, and other research make good business sense and achieve measurable public health milestones.

Important findings from the Pennsylvania Salmonella enteritidis Pilot Project were that

older flocks were more likely to have SE and that environment tests don't always identify SE positive flocks. About 50 percent of the flocks with SE positive environments produced SE positive eggs. In a limited study in the immediate post molt period (0-5 weeks after start of molt), a significantly higher number of SE positive eggs were laid than background prevalence, e.g. 14.4 eggs/10,000 versus 2.75/10,000. Further studies are needed on field prevalence of SE contaminated eggs from SE positive flocks in the post molt period.

Other important research from Maine (Henzler and Opitz, 1992) was that house mice (*Mus musculus*), the common mouse found in poultry houses, are selectively sensitive to SE and are more likely to have this strain of Salmonella over other strains which are more common in poultry. Mice droppings can contain over 1/4 million SE bacteria, and a mouse produces on average 100 droppings a day. SE is three times more likely to be cultured from mice in a SE positive environment than environmental samples from the same house. SE can remain in the

mice in houses after thorough cleaning and disinfection, thus serving to expose replacement pullets to Salmonella enteritidis if the producer doesn't eliminate mice from the previous flock. Rats are similar. In other mouse studies, researchers Petter and Henzler et al., 1997, isolated certain types of SE from mice which were more likely to have cell structures producing high-molecular weight lipopolysaccharides with enhanced ability to contaminate eggs from hens.

A ten-fold greater risk of flocks producing SE contaminated eggs was noted in flocks with high levels of SE isolated from the manure as compared to low numbers when compared against 5 other potential risk factors for hens producing contaminated eggs (Henzler, Kradel, and Sischo, 1998). Hence, when 50 percent and greater of the manure samples taken from the hen house environment (pit) were positive for S. enteritidis this was an indicator that the particular flock was more likely to produce contaminated eggs than flocks with less than 50 percent of their manure samples positive for SE.

In total, over 1100 commercial chicken flocks enrolled in the Pennsylvania Egg Quality Assurance Program (PEQAP) over a five year period (1994-1999) had an overall prevalence (level of infection) of Salmonella enteritidis of 13.9 percent. Over 85 percent of the Pennsylvania layer industry are enrolled in PEQAP representing 23,929,600 hens through April of 1999. A subset of these flocks (houses) present in 1992 in the SE Pilot Project showed a 3.5 fold reduction from 25.7 percent to 7.3 percent in the level of environmental contamination of SE. Similarly, a 1.6 fold reduction in the number of environmental samples positive for SE resulted from the intensive risk reduction measures over the years.

The environments are checked three times in the hen's life cycle at 30 and 45 weeks of age and 5 to 7 weeks post molt. Of these three environmental tests, it is the 30-week test which was most important in identifying a SE positive flock. This was most apparent in complex houses where 75.5 percent of positive flocks were detected with this 30-week test. In single-stand alone houses 40.9 percent of SE positive houses were identified on this test. Over time, it is clear that the HACCP risk reduction practices were effective in PEQAP. This is noted as houses newly enrolled on the project (having two or less flocks in production through them) had much higher incidence rates of SE than established houses (houses with three and greater flocks in production through them) across any of the three environmental test periods. This difference is likely due to the effects of third party monitoring (Pennsylvania Department of Agriculture) and the producer's commitment to adhere to risk reduction strategies. Flocks not enrolled in an egg quality assurance program are less likely to direct resources (labor and financial) for intensive rodent control, thorough cleaning and disinfection, sampling of the environment (sometimes more than a single time), and sampling of eggs for SE.

Similarly, the number of eggs positive for SE have precipitously dropped from 1992 to 1998 in Pennsylvania flocks. During the Pennsylvania SE Pilot Project 647,000 were cultured from SE positive flocks and an overall prevalence of S. enteritidis egg — contamination

was 0.0275 or 2.75 eggs/10,000 produced. In the five year PEQAP monitoring from 1994 to 1999, a total of 933,900 eggs were cultured from SE positive flocks for a S. enteritidis contamination rate of 0.016 or 1.6 eggs/10,000 produced.

Another significant public health statistic measure is the reduction of human S. enteritidis isolation rates from the four mid-Atlantic states in which Pennsylvania is the chief supplier of eggs (Pennsylvania, Maryland, New York and New Jersey). Between 43.5 percent and 50.0 percent decrease in these four states with a combined overall decrease in human S. enteritidis isolation rate per 100,000 population of 49.4 percent was observed in the nine year period 1989 to 1997 (CDC based statistics). While the PEQAP, alone, did not account for this dramatic rate reduction — it was a likely contributor. This is further measured by the lower overall egg contamination rate of 1.6 eggs versus 2.75 per 10,000 produced from SE environmental positive flocks and the targeted diversion of any identified flock producing SE contaminated eggs to pasteurized or hard cooked eggs.

Flocks housed in single-stand alone houses had 9.8 percent of their environments contaminated with S. enteritidis as compared with 16.7 percent of flocks housed in complexes. Hence, complex-housed flocks were 1.7 times more frequently contaminated than single houses. Difficulties associated with the isolation of individual houses in complexes likely contribute to this higher contamination level. Rodent control is not easy to achieve on a prolonged basis unless management closely monitors the progress of baiting programs and Rodent Indexing (RI). It requires persistent and continual weekly efforts to maintain rodent control in commercial chicken houses with both management and labor reviewing records monthly house by house to measure results. Cleaning and disinfection of SE environmental positive houses is ongoing as new pullets are subsequently placed in the disinfected house, and workers are traveling amongst all flocks. The risk this presents for transmission of Salmonellae is not quantified or truly known. Ventilation systems continue to exhaust air containing feathers and airborne bacteria, possibly serving as a source of Salmonellae contamination of S. enteritidis clean hens or at least their environments. Likely horizontal transmission (bird to bird) of S. enteritidis through airborne methods has been demonstrated in small-scale research facilities (Cast, Mitchell, and Holt, 1998). The ecology of the S. enteritidis bacterium and its spread within commercial flocks is not adequately studied. These factors multiply the difficulty of actual elimination of S. enteritidis especially from multiple-house complexes as these data suggest from surveillance of 1,107 commercial chicken layer flocks over greater than five years (1994-1999).

This study was presented at: 2000 Southeastern Commercial Egg Producers Forum, May 11-12, 2000 Tybee Island, Georgia and Pennsylvania Department of Health Quarterly Epidemiology Meeting, Harrisburg, PA, May 18, 2000.



PRICES THAT WILL SHOCK YOU !!!

UP TO
60% OFF

**SUPER
HEAVY STEEL**

- Equipment Storage!
- Workshops!

**FAST AND SIMPLE TO ERECT!!
NO CRANE NEEDED!!**

AVAILABLE MODELS
30 x 50 (2 LEFT) 40 x 64 (3 LEFT)
45 x 80 (2 LEFT) 52 x 100 (1 LEFT)
55 x 120 (2 LEFT)



EXCELLENT FOR HAY
AND GRAIN STORAGE

800/825-5059

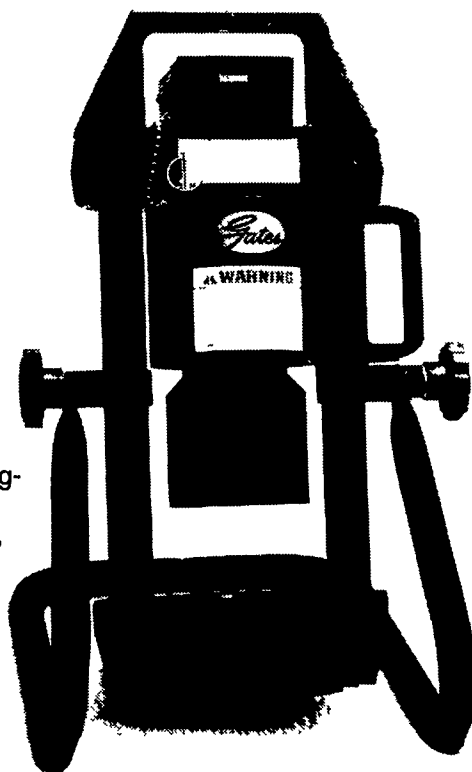
Introducing the Gates
MobileCrimp™ 4-20
crimper: Fast, simple
and versatile.

You Can Take It With You.

And when you take the gates MobileCrimp™ 4-20 crimper with you, on-site repairs will be faster, easier, and cover more applications than ever before. That's because Gates designed this portable crimper with unmatched versatility and coverage. The MobileCrimp 4-20 crimper allows for variable crimping positions and a swing-away cylinder for easier loading of dies and assemblies. Operating with nearly any hand, air, or electrical 10,000 PSI pump, you'll be able to crimp anything from low-pressure return lines up to four-spiral hose with 1 1/4" I.D. No other portable crimper has that kind of application coverage. Visit your Gates distributor to find out more about the powerful MobileCrimp 4-20 crimper — and feel free to take one with you.



THE WORLD'S MOST TRUSTED NAME IN BELTS, HOSE AND HYDRAULICS.



BeilerHydraulics
HYDRAULICS • PNEUMATICS • POWER TRANSMISSION
440 Concrete Ave • Leola PA 17540 • 717-656-4878 • Fax 717-656-4692

Est.
1979