

# Egg Industry

News for the Egg Industry Worldwide

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## Despite High Feed Costs, Egg Executives Look for Profitable 2008

*But industry leaders are concerned about California's anti-cage ballot initiative.*



By Edward Clark, Editor

**B**ucking historical trends, most egg companies are not plugging much of last year's record profits into new facilities—yet anyway—and that adds up to one thing: another year of high prices and profits, though perhaps not quite as high as 2007. And 2009 could look good as well, some say.

“Prices will be somewhat less, the hatch is up a little. I don't know if we can maintain last year's price, but 2008 will still be profitable,” says Gary West, president of JS West and Cos., Modesto, Calif., and new chairman of the United Egg Producers' (UEP) board.

West's view is echoed by others. “Our forecast is that the supply side will be similar to 2007. Prices in 2008 could be as good,” says Dolph Baker, president

of Cal-Maine Foods, Jackson, Miss. “What we learned in 2007 is that we have control of our destiny if we work at it, and as an industry, 2008 could be another super year.”

### Growing Through Acquisition

Cal-Maine has no plans to expand in 2008 by building new facilities, he says, adding that “our objective is to grow through acquisition.” The only

exception to that, he says, “is that we are building a facility in West Texas to replace one we had closed down.” One reason why the industry nationwide is doing such little expansion is that “people are enjoying record profits,” he says, and that there is much uncertainty, such as the future of caged legislation, and high grain prices.

The likelihood of another good profit year in 2008 notwithstanding, however, Baker says that “we'll always be a commodity business and have ups and downs. It's hard to look out more than one year.”

Baker says Cal-Maine is very committed to growing the specialty egg side of its business, which last year represented 9 percent of eggs sold but 15 percent of shell egg revenue.

### HSUS Initiative

West says he is finishing up an expansion started a year ago, but no more, out of concern over the initiative underway



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by the Humane Society of the United States (HSUS) to try and ban caged production in California.

West expects HSUS to be successful in gathering the 434,000 signatures required by the end of February—HSUS’s goal is 650,000—for it to be placed before voters as a ballot measure this November. He believes the egg industry will be successful in defeating the measure, but it won’t come cheap: an estimated \$10 million

goal of HSUS is to put animal agriculture producers out of business.

West says that part of how the industry will fight the anti-cage effort is to set up tours of egg ranches for the media, supermarkets and others to show them how well caged hens are treated.

### ‘We Can’t Let Them Win’

It’s not only California producers who are concerned about the California initiative. “We can’t let them win. If California

feed available, especially corn. That’s because there is such a demand for corn from ethanol plants, thus the price of conventional corn is at record levels.

High prices also did not effect Cal-Maine’s sales, says Baker, who calls sales “pretty flat from looking at our numbers. I don’t know that price has hurt demand.”

While the HSUS effort is delaying expansions, it’s not the only reason, West says. Another major reason is the difficulty in obtaining permits, which can take 1.5 years, and the difficulty in meeting air quality and other environmental regulations.

One factor responsible for such high prices in 2007 was the bump up in U.S. egg exports, but industry officials such as Baker are not convinced that 2008 will necessarily be as good. “I don’t know that we’ll have that opportunity in 2008,” he says, adding that if companies control egg supplies, “we could price ourselves out of the export market.”

### Egg Product Expansion?

One area where expansion may be taking place is egg products. “We’re seeing a lot of stuff being built on the egg products side, such as in Ohio,” says Marcus Rust, an owner of Rose Acre Farms, Seymour, Ind. That said, he believes 2008 “will still be profitable,” but he has questions about 2009, since more production will mean prices will go down. Rust adds that “since the beginning of time, we have been able to produce more than we consume, and that will never change.” He adds that “we are not the only kid on the block to expand. We’ve always been an industry that can’t stand profitability.”

On specialty eggs, Rust says that the same consumers who are buying special-

**“What we learned in 2007 is that we have control of our destiny if we work at it, and as an industry, 2008 could be another super year”  
—Dolph Baker, Cal-Maine Foods**

will be required to battle the measure, in part through a firm with a 95 percent track record, he says. “Our chances are very good,” he adds.

West says that if the measure fails like he expects, “we will continue on building.” The measure would ban caged production after 2015, and West says California producers are not going to invest in additional facilities until they know that they can use new battery cage facilities on a long-term basis.

Were the ballot measure to pass, West says that all it would accomplish would be to put California producers out of business, since conventional eggs still would be shipped to California from Iowa—and possibly Mexico and China—because interstate commerce rules would prohibit barring imports from other states and countries. The measure “is ridiculous,” he says, adding that the

falls, there will be other states,” says Cal-Maine’s Baker. “As an industry, we have to win. I know that UEP and the American Egg Board (AEB) are committed to helping California producers fight.” AEB cannot enter the battle directly, however, because of USDA checkoff rules, but AEB can promote the fact that California hens are humanely treated, West says.

### California 10% Specialty Eggs

Despite the large increase in egg prices over the past year, California demand has remained stable, with about 90 percent conventional sales and 10 percent specialty eggs (which includes brown eggs). The specialty egg market remains stable in California, West says. “Eggs are still a very cheap protein source,” he adds. West continues that when it comes to organic eggs, however, there is more demand than supply, due to the lack of organic

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ty eggs are those who buy bottled water. “They have the view that if it costs more, it must be better.”

One change Rose Acre has made of late, Rust says, is to manipulate the feed formula to make the manure more “green,” which not only is better for the environment, but it makes a better fertilizer, which Rose Acre is able to sell in lawn and garden stores. Rose Acre has installed a new plant that produces the fertilizer.

## Old Infrastructure

Bob Krouse, president of Midwest Poultry Services, Meltone, Ind., is not looking for the industry to expand much this year, and his firm is not planning an expansion. In late January he noted that the Urner Barry Midwest large price quote was still an amazingly strong \$1.59. “Things are pretty tight on the supply

that producers have cash, they’re reluctant to spend it on new facilities; and

- Feed costs. At 65 percent of the cost of production, feed is more expensive than it’s ever been, and that’s keeping some from expanding.

One important reason why production is so low, he says, is that when producers replace cages, they do so with larger cages to meet UEP’s animal welfare guidelines, thus fewer birds than under their old systems. He also says that even if producers were to start with expansion plans now, it could take well into 2009 or longer before production actually starts, adding the time it takes to obtain permits, and have equipment ordered and delivered.

Krouse says that his company “will only expand when we have additional business—we don’t want to put in birds on spec.” If he does obtain additional

of UEP, agrees with others that 2008 is likely to be another profitable year, despite record high feed prices.

“According to equipment companies, there is very little caged equipment being sold, although there is some cage-free being sold” as some producers are converting caged systems to cage-free or organic. He adds that “the egg surplus is very small.” He looks for no more than 1 percent to 2 percent more birds in 2008 than 2007, “and we need some modest growth with the population growing by 3 million per year.” In addition, he adds, dried egg supplies are at very low levels, 59 percent below year-earlier levels as of Dec. 31.

Gregory says there are several key reasons why producers are not expanding. The industry has been through several years of big losses, the rapidly growing ethanol industry has ratcheted up feed costs dramatically, and producers have questions about whether cage-free activists will be successful in their efforts to pass legislation or referenda that ban conventional cages.

He says that the industry has a good chance of defeating legislative measures, but referenda are tougher. “California is the testing ground,” Gregory says. “If we can win in California, it’s really good news. If we lose, there are 23 more states that can put it on the ballot. On the positive side for the industry, he says, is that HSUS is having a harder time obtaining signatures in California than it originally thought it would, and has had to hire professional signature gatherers.

What makes it so important to defeat mandatory cage-free efforts, Gregory says, is that if successful, the cost of all eggs will go up considerably “and we’ll sell fewer eggs. There is a segment of society that cannot afford more costly eggs.” He says that in Europe, “per capita consumption has gone down considerably” in cage-free countries.

UEP, he says, believes in consumer choice, and also believes that bird welfare and food safety is higher with battery cages. He adds, birds in the open are more at risk from avian influenza. **EI**

**▶ “I really think 2009 looks pretty good as well”  
—Bob Krouse, president, Midwest Poultry Services**

side,” Krouse states. “I really think 2009 looks pretty good as well,” he adds.

In Krouse’s view, “every single cage that can, has a chicken in it,” thus the industry cannot expand without the creation of expensive new facilities. “We’ve just started to make money after 3 to 4 years of losses.”

The key reason why he believes (see related article in this issue) that the industry cannot expand so quickly as to erase profitability is that it has a very old infrastructure, and producers are reluctant to add additional cages right now.

“There are a million reasons why and every producer has a different set of reasons,” he says. His top 5 reasons why he thinks producers are not expanding are these:

- The cost of putting in new housing as a consequence of UEP guidelines;
- Ballot initiatives and legislative efforts to ban battery cages;
- Economies of scale. A 500,000-bird unit cannot compete with one that’s 5 million or 10 million;
- Horrible cyclical profitability—now

business, he says he will probably buy eggs “on the outside for a while before expanding.”

Krouse says that while some producers may be not expanding out of concern that animal welfare activists may be successful in requiring that eggs produced be cage-free, that doesn’t concern him. “I don’t believe activists will be successful in dictating their wishes on the 95 percent of consumers who are buying high-quality, conventionally produced eggs in our markets.” He does have 200,000 birds to meet cage-free needs of customers, “and I’d like to have more, but there is not that big a demand.”

About the only way Krouse sees prices moving much lower anytime soon is if producers start aggressively cutting prices to obtain new accounts.

One thing Krouse has observed in the past year is that “demand is inelastic. We sell as many eggs at \$1.70 as we do at 65 cents.”

## Little Caged Expansion

Gene Gregory, president and CEO



## Softer 2008 Prices than '07, But Still Strong

Egg prices are likely to be strong in 2008, though not quite as strong as last year, according to USDA's Economic Research Service (ERS) latest forecast. The agency calls for 2008 prices to average 95 cents to \$1.02/dozen, New York, compared to \$1.13 for 2007.

By quarter, ERS forecasts prices to be \$1.07 to \$1.13, New York, in the first quarter, 94 cents to \$1.02 in the second quarter, 87 cents to 95 cents in the third quarter, and 87 cents to 95 cents in the third quarter.

Prices could well be the second highest in recent years, eclipsed only by 2007. Prices in 2006 were 71.8 cents, 71.4 cents in 2005, 65.5 cents in 2005, and 82.2 cents in 2004.

On the demand front, ERS forecasts per capita consumption this year to be 251.6, up slightly from 2007's 249.2, but still lower than the 255.7 in 2006, 255.3 in 2005, and 256.9 in 2004.

ERS forecasts production to be up less than 2 percent this year.

## U.K. Could Be Cage-Free within 2 Years

Major supermarkets in the United Kingdom are going cage-free four years before a European Union (EU) law requiring them to do so. Sainsbury's and Morrisons have agreed to go cage-free over the next two years, with Marks & Spencer, and Waitrose making an earlier move to go cage-free, according to an article in the *Telegraph.co.uk*. The EU law banning battery cages goes into effect in 2012.

Asda and Tesco have not yet gone cage-free, but have cut back on shelf space given to eggs from hens raised in battery cages.

In Great Britain, enriched cages, which are larger and have a perch, nest and litter, will still be allowed under U.K. rules, although Germany will ban those cages as well.

## Britain Ban on Cages May Not Work

The U.K. decision to ban battery cages by 2012 like the rest of Europe may

not work in practice. "We believe the EU ban on battery cage egg production will be worse than useless in improving chicken welfare if the same standards are not applied to import," the National Farmers Union West Midlands public relations officer Oliver Cartwright says in the *Kenilworth Weekly News*. "We are calling on the government to set an example in its own food procurement policies," he says.

The British government estimates that at present, 63 percent of eggs produced in the country are from hens in battery cages, with 32 percent free range. The other 5 percent are eggs from cage-free hens raised indoors.

## Restaurateur Opposed to Battery Cages Used Them

A British television chef opposed to battery cages and factory farming, found himself embarrassed recently when one of his restaurants was found using eggs from battery hens just as his show was being broadcast. "Heads will roll," chef Jamie Oliver, host of the U.K.'s "Jamie's Fowl Dinners," said.

He was found out by a farmer who saw that the eggs on display in the kitchen did not have the free-range stamp.

## Cage-Free Battle on Several Fronts

The Humane Society of the United States has now introduced or is proposing to introduce legislation or ballot initiatives in California, Colorado, New Hampshire, and Washington. If passed, the measures would ban caged egg production.

The biggest concern right now is California, says Gene Gregory, president and CEO of the United Egg Producers (UEP). The reason why, he says, is that the measure there is a ballot referendum, with the efforts in other states being legislation. It is easier to defeat a legislative effort than a ballot initiative, he says, and fears that if the California effort is successful, ballot efforts could be attempted in other states. Twenty-three states allow ballot initiatives.

UEP Certified companies have set aside a portion of their 2008 public relations funds to support producers in states where caged measures are being fought. **EI**



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# Infrastructure's Role in Keeping Egg Prices High

By Sam Krouse, Senior Research Analyst for Midwest Poultry Services, L.P., and Bob Krouse, President

Greene had its Golden Age around 440 BCE, Bill Clinton has claimed one for the United States in the 1990s, and now the U.S. egg industry is finally having its turn. Egg prices have soared at historic highs through months in which producers usually hold on for dear life. In the past, one could always expect to see a crash in prices directly after profitable periods, due to the nature of commodity markets. Today, however, there are dozens of variables affecting the egg market that could stave off a price crash for some time. The purpose of this report is to investigate how the industry came into such a profitable position and what the market is likely to do in the short-term future.

Among the reasons why the industry is so profitable now are: changes in cage space due to the requirements of the United Egg Producers (UEP) animal care guidelines, increased egg exports and an aging infrastructure coupled with the terrible market the industry experienced throughout 2005 and 2006. The short-term future of the industry has huge potential as well, especially with the continuation of trends that are likely to keep supply tight, including a reluctance to invest in new equipment, a huge number of old and obsolete cages currently in production, and a slew of other difficult-to-quantify variables. When all of the above factors are compounded, it seems that the egg industry may find itself in a position of lengthy

economic prosperity previously unmatched in its long and tumultuous history.

## Cage Space Attrition

Cage space attrition due to the requirements of the UEP guidelines and basic wear-and-tear have been the leading factors in keeping supply tight and prices high. While depreciation always has and always will be around, the UEP animal care guidelines are an evolving force in the industry that have caused some expected and some unexpected complications.

One basic effect of the guidelines'

lion cage spaces in the shell egg market and about 22 million in the egg product market, but for the time being this analysis focuses primarily on the shell egg market. Thus, from 2002 to the present day, the shell egg industry has already lost 37 million cage spaces to the UEP guidelines alone. Assuming a constant flock size of 196 million hens, the industry will go on to lose a total of 56.5 million by 2010.

Table No. 1 provides a rough year-by-year breakdown of the effect of the UEP certified program on the number of cage spaces available for shell egg production. The guidelines state that

TABLE 1 Effects of UEP Guideline Implementation

Initial 2002 Shell Egg Flock Size: 196,000,000

Date	Existing Cage Space (sq. in.)	New Required Cage Space (sq. in.)	Percent Cage Spaces Lost	Number of Cage Spaces Lost
April 1, 2002	100%- 52 (est. avg.)	56	0.0%	-
October 1, 2003	50%- 52 / 50%- 56	59	3.8%	7,538,462
April 1, 2004	100%- 56 / 0%- 59	-	7.7%	15,076,923
April 1, 2005	50%- 56 / 50%- 59	61	10.6%	20,730,769
October 1, 2005	100%- 59 / 0%- 61	-	13.5%	26,384,615
October 1, 2006	50%- 59 / 50%- 61	64	16.3%	32,038,462
April 1, 2007	100%- 61 / 0%- 64	-	17.3%	33,923,077
April 1, 2008	50%- 61 / 50%- 64	67	20.2%	39,576,923
October 1, 2008	100%- 64 / 0%- 67	-	23.1%	45,230,769
April 1, 2010	100%- 67	-	28.8%	56,538,462

The above chart shows the impact of United Egg Producers' guidelines on cage space loss.

required increase in cage space is that, overall, the industry has lost about 20 percent of space available in existing houses, a trend which will continue through April of 2010, when all cages in the UEP program will have to provide 67 square inches per bird and 29 percent of space present in 2002 has been lost.

Of course, all of these changes only apply to participants in the UEP certified program, which includes 196 mil-

lion birds hatched after each implementation date must be housed at the specified density. Thus, the actual conversion over to the space required can take up to two years for the whole industry, as shown by the gradual change in existing cage space. The percentages of producers at these space allowances are only rough estimates, intended to represent the progression of additional cage space across the industry. The only points that are absolutely certain

are those at which 100 percent of the industry, enrolled in the UEP program, is at one size, as these deadlines are closely monitored by third party auditors. Of course, implementation of the UEP certified program is not the only reason for the industry's rapidly disappearing cages.

The wearing out of cages is another major factor that can help explain these extraordinary egg prices, especially because its effect is multiplied by both the guidelines and horrible markets of

**Cage space attrition due to the requirements of the UEP guidelines and basic wear-and-tear have been the leading factors in keeping supply tight and prices high**

2005 and 2006. Assuming an average cage life of 25 years and an initial shell egg flock size of 196 million birds in 2002, an average of 7.7 million cage spaces should be replaced by new ones each year, adding up to 46 million cage spaces since 2002 (Table No. 2).

### Prior to New Guidelines

Prior to the implementation of the UEP's animal husbandry guidelines, most producers in the United States simply replaced old cages with similar A-frame systems. Today however, many producers are finding that A-frame, high-rise systems make it difficult to meet the requirements of the UEP guidelines, customer expectations and environmental regulations. As a result, when the time comes to replace the cage equipment in an older facility, in addition to increased space per bird, a producer must consider switching to a newer stacked deck or scraper board system rather than the familiar high-rise house. Stacked deck systems are much more complex and expensive to install, costing around \$12 per bird rather than \$5 per bird for high-rise. Additionally, these highly sophisticated systems re-

quire new management techniques and have higher operating costs.

While the high cost and lack of experience with non A-frame systems are two key factors, it is important to keep in mind that there are many concerns and barriers leading egg producers to hesitate spending their recent windfall on new cages. Some of these include:

- Ever increasing environmental laws and regulations;

- Constantly changing food safety and security laws and regulations;

- Ballot initiatives in several states to outlaw caged egg production;

- Legislative initiatives in several states to outlaw caged egg production;

- Difficulty obtaining necessary permits for new or expanding facilities;

- Dramatically changing economies of scale (2,500,000 hen complexes compared to 500,000);

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## | Infrastructure's Role |

- Customer base consolidation (Larger customers and warehousing facilities require larger suppliers);
- Industry economic history (approx-

- imate breakeven over past 10 years);
- Constant, serious challenges from animal activist groups attempting to eliminate caged egg production;

- Constant, serious challenges from environmental activist groups; attempting to eliminate large-scale agriculture, especially confined animal feeding operations (CAFOs);
- Heightened feed costs and instability due to an exponential increase in ethanol production.

This hesitance or inability to replace worn-out equipment is confirmed by information gathered from the cage manufacturing industry.

For the most part, producers have been able to keep up with demand by using any and all available funds to maintain older equipment or expand when possible. From the point of implementation of the guidelines in 2002 through about April of 2004, the industry stayed profitable

**TABLE 2 U.S. Egg Industry Infrastructure Analysis**

	Shell Eggs	Egg Products	Total
Percent of Total Egg Industry	70%	30%	100%
2007 Number of Hens	203,000,000	87,000,000	290,000,000
2002 Number of Hens	196,000,000	84,000,000	280,000,000
Net Number of Hens Increase, 2002 - 2007	7,000,000	3,000,000	10,000,000
New Cage Spaces Installed, 2002 - 2007	54,000,000	23,000,000	77,000,000
Cage Spaces Lost to Cert. An. Welfare Prog.	-37,000,000	-7,000,000	-44,000,000
Cage Spaces for Net Number of Hen Increase	-7,000,000	-3,000,000	-10,000,000
New Cage Spaces Available to Replace Obsolete Equipment	10,000,000	13,000,000	23,000,000
Standard Depreciation 2002 - 2007*	46,000,000	20,000,000	66,000,000
Less: New Cage Spaces Available to Replace Obsolete Equipment	-11,000,000	-13,000,000	-23,000,000
Obsolete Cage Spaces Still In Production	36,000,000	7,000,000	43,000,000
% of Obsolete Cage Spaces Still In Production	18%	8%	15%

\*Standard Depreciation is based upon a 25 year equipment life.

Source: USDA/Industry Sources/Midwest Poultry Services Research

The above table shows how infrastructure changes are affecting U.S. egg production.

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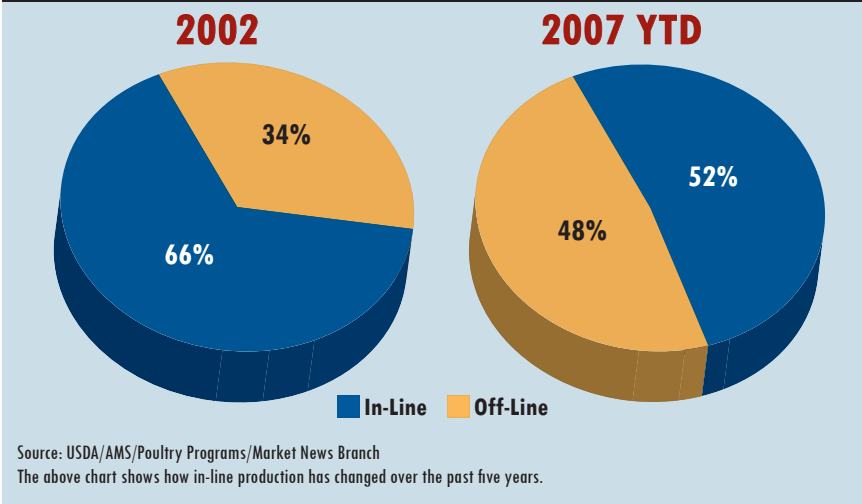
and, as a result, it had enough money to keep up with the increased size requirements and to continue expanding.

The number of cages placed between 2002 and 2004 exceeds the number of cages required to make up for lost space and depreciation by about 16.7 million. The result of that over-expansion hit the industry hard, causing it to lose an average of \$0.069 per dozen in 2005 and \$0.071 in 2006, as reported by Don Bell in EEU report No. 279. According to the USDA, the industry produced 211 million eggs per day in 2005 and 214 in 2006, resulting in industry losses of \$1.2 million every day in 2005 and \$1.3 in 2006.

### Aging Equipment

Since then, producers have been able to scrape by with a constant supply of birds mostly by filling up cages that may have been empty and by holding on to older, grandfathered cages for longer than what may be most efficient. New cage installation slowed to

### In-Line vs. Off-Line Production



a virtual halt, but the surplus of cage spaces installed from 2002 to 2004 helped maintain supply levels. With aging equipment and constantly increasing cage space requirements however, producers can only hold on for so long, and by this point it seems that

these factors combined with a general lack of investment in new equipment have caught up with the industry and are making it more difficult than ever to maintain a constant flock size, let alone expand.

Up to this point, most information

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## | Infrastructure's Role |

regarding the number of cages installed referred to the egg industry as a whole, including egg products. This can be

misleading when trying to look solely at the shell egg market because one phenomenon that has swept through the industry in the last six years is a huge increase in the number of in-line breaking facilities. While this kind of production only made up 34 percent of the egg breaking industry in 2002, today it makes up nearly 50 percent (Chart No. 1).

Growth of in-line breaking facilities has required the installation of an additional 23 million cages over the past 6 years. This higher level of investment by the industry has allowed it to better maintain its infrastructure with only 8 percent of its hens in obsolete facilities compared to 18 percent in the shell egg industry.

Another important change over the past few years has been the effect of continually increasing hen productivity. According to industry estimates, over the past six years, the industry has seen an increase in productivity equal to an extra 14 million birds, or a 5 percent increase. This would, of course, help to offset some of the reduced cage space if not for another important variable, the constantly increasing population of the United States. During the same amount of time that layer productivity increased by 5 percent, the U.S. population also grew by 5 percent, as reported by the U.S. Census Bureau. These two variables end up canceling each other out, and it is reasonable to assume that this relationship will continue at least for the next several years.

When one extends all of these trends a couple of years into the future, it is clear that there is no reason to expect its sustained prices to drop down below break-even levels any time soon. As shown in Table No. 3, an additional

**TABLE 3 Infrastructure Analysis, 2008 - 2010**

2007 Hens in UEP Certified Program, approx.	219,000,000
Percent of Cage Space Increase Through 2010	7%
Number of Hen Spaces Needed to accommodate UEP Guidelines 2008 - 2010	15,000,000
<b>2008</b>	
New Hen Spaces, Guidelines	6,200,000
Standard Depreciation	11,000,000
New Hen Spaces Needed	17,200,000
<b>2009</b>	
New Hen Spaces, Guidelines	6,200,000
Standard Depreciation	11,000,000
New Hen Spaces Needed	17,200,000
<b>2010</b>	
New Hen Spaces, Guidelines	1,600,000
Standard Depreciation	11,000,000
New Hen Spaces Needed	12,600,000
Total Hen Spaces Required to Replace Obsolete Equipment and Accommodate UEP Guidelines, 2008 - 2010	47,000,000

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47,000,000 cage spaces must be installed between 2008 and 2010 to keep the industry's infrastructure from becoming even smaller and less efficient.

Table No. 3 shows how much additional space is needed for UEP guidelines.

## Summary

How long our industry will remain profitable is always difficult to predict and subject to many different interpretations. This report is an attempt to provide one point of view and hopefully stimulate additional discussion on the subject.

One important but unproven assumption we have made is that, with

**Whenever new construction begins on a large scale (and it does not appear to have started yet), we will have about one year of great egg prices before oversupply brings this exciting ride to an abrupt halt.**

the Urner Barry large egg price over \$1.60, every cage in the country that can hold a hen is probably full. If this is the case and we are as far behind in replacing older equipment as our numbers show, the industry has no way to increase production in the short term. If producers continue to follow the UEP animal husbandry guidelines, as appears likely, we can not quickly increase flock size by placing an additional hen in each cage. Planning and installing new cage equipment will take at least eight months to one year from beginning to end. Our basic conclusion is that whenever new construction begins on a large scale (and it does not appear to have started yet), we will have about one year of great egg prices before oversupply brings this exciting ride to an abrupt halt.

El

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# Shell Defects Impact Profits

By Dr. Simon M. Shane

Given the recent and most welcome increase in the price of eggs, there is understandably a greater concern for shell quality to market as many eggs of acceptable quality as possible. The importance of shell quality is even greater with specialty products sold at a premium since losses are proportionately greater and the expectations of consumers are higher than with generic eggs.

## Financial Impact of Shell Defects

It is calculated that a one million in-line operation with an average egg produc-

tion but obviously are significant if an entire complex or a high proportion of flocks are affected.

## Causes of Shell Defects

**Nutrition** - Traditionally, textbooks implicate improper diet as a major cause of shell defects. Deficiencies or imbalances in calcium and available phosphorous or inadequate intake of vitamin D<sub>3</sub> are potentially responsible for osteomalacia in hens and reduced shell strength. Under commercial conditions in the United States, improper diet is seldom the cause of suboptimal shell mineralization. In the event that a pullet-rearing diet with 1 percent calcium content

usually identify the cause. Supplementing diets with excessive quantities of calcium, phosphorous or vitamin D<sub>3</sub> will not improve shell quality if the defect is caused by other than a defective diet.

Appropriate preventive action is required for flocks, which may show defective shell density due to exposure to infectious bronchitis or adenovirus or on complexes where hens hyperventilate due to prolonged elevated temperature. Adding additional calcium to diets, in excess of a 4.5 percent level without balancing phosphorous and other nutrients is invariably counterproductive when the underlying cause for the decreased shell strength is unrelated to diet.



Clean eggs on rod conveyor



Clean belt control contributes to clean shells

tion of 80 percent would incur an annual loss of \$25,000 for each 1 percent diversion of saleable eggs to breakers for each incremental 10-cent differential in revenue between wholesale and salvage values. Applying the basic formula, it is calculated that an average one million-hen complex could lose \$225,000 annually with an additional 3 percent defects and a 30-cent/dozen difference between revenue from nest run and breaking. In the case of branded and specialty eggs, loss in goodwill, image, and consumer loyalty are difficult to quantify,

is inadvertently delivered to a flock in production, the turnover rate of feed in a house of over 60,000 hens with a 15-ton bin is generally so rapid that skeletal reserves of calcium are adequate to maintain shell quality with suboptimal calcium intake, providing the duration does not exceed a week.

Deficient feed as a result of improper formulation or mixing could be a consideration with diets prepared on site by specialty, organic or small-scale operations. A review of formulas, postmortem examination of hens, a survey of eggs and analyses of feed will

**Elevated Ambient Temperature** - Hens subjected to high temperatures hyperventilate, especially with concurrent elevated humidity or inadequate ventilation. An increase in respiratory rate is a physiological response to high temperatures to reduce body temperature by evaporation of moisture from the mucosa of the respiratory tract. Unfortunately, prolonged hyperventilation results in excessive excretion of carbon dioxide, resulting in respiratory alkalosis. This interferes with the active deposition of mineral in the shell gland of



the oviduct, which depends on the activity of acid phosphatase.

Hens subjected to high temperatures during summer produce shells with reduced density. Checks may increase to 8 percent following a week during which house temperatures exceed 85 to 90° F for more than six hours per day. These episodes are usually associated with increased daily water intake exceeding six gallons per 100 hens and thermal distress noted by the high proportion of hens which pant together with decreased egg production and elevated mortality. Hens which have been dubbed are more susceptible to high ambient temperature than flocks with entire combs.

Basically, the only approach to resolving shell problems arising from high ambient temperature involves increasing ventilation rates to above 1 cfm/lb. live weight and applying evaporative cooling either through pads or a high efficiency nozzle system. These installations have the ability to reduce dry bulb house temperature by 10° F, depending on efficiency and prevailing humidity. In older houses, installation of new insulating material could be considered, but the cost effectiveness of this upgrade should be justified by improved egg production and shell quality. Nutritional approaches to resolving the problems of high temperature are generally ineffective and, at best, of short duration and ameliorative. Supplementing diets with vitamin C has been attempted in tropical and desert countries but the cost-effectiveness of the addition is questionable.

A number of years ago synthetic zeolites including sodium calcium aluminosilicate were promoted to improve shell quality based on limited trials. Generally, the industry has not adopted this measure to enhance shell quality under hot conditions.

## Disease

**Infectious Bronchitis** - Exposure of flocks to infectious bronchitis (IB) during the late rearing stage will damage the oviduct tissue responsible for active deposition of mineral during shell formation. Flocks that are improperly protected by narrow spectrum vaccination during the early rearing period undergo exposure when transferred to multi-age in-line complexes. Variant strains of IBV that are responsible for defective shells have been identified in the Midwest and western states. Flocks that are exposed to

IBV produce eggs with an abnormal shape, whorls of mineral especially at the equator of the egg and generally shells have suboptimal strength. The problem may be more pronounced towards the end of the first cycle and after molting.

Immunosuppression of flocks during the early brooding period following exposure to Marek's disease or infectious bursal disease (IBD) may reduce the antibody response to

subsequent vaccination against IB and other antigens resulting in a mosaic of susceptibility in the flock. Detailed epidemiologic evaluation is indicated following recurring episodes of defective shell thickness and defects in successive flocks. This usually involves a structured serologic survey using ELISA to ascertain the antibody status of flocks at the time of transfer and at 20-week intervals thereafter in addition to

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## | Shell Defects |

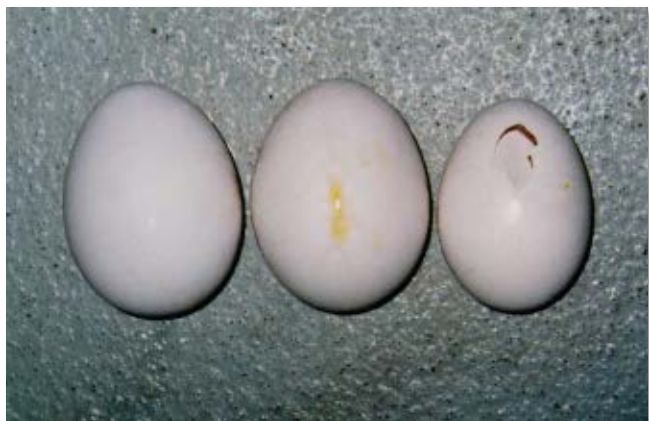
the response to IBD and IB vaccinations. Since ELISA is group specific, the serum virus neutralization procedure is required to distinguish among IBV strains to which flocks may be exposed. It is imperative to select IB vaccines to protect flocks against field strains to which they may be exposed. Waning of immunity can be compensated

range of ELISA titer groups should be reviewed to confirm uniformity in protection. Experience has revealed many flocks with a mean protective titer of 4,000 to 6,000 ELISA units but with up to 15 percent to 20 percent of individual hens in a sample of 20 sera showing susceptibility. Consecutive ELISA assays on wing-banded hens or samples obtained from identified cages should confirm seroconversion following

either respiratory adenovirus or IB results in a transitory decrease in the intensity of pigmentation in brown-shelled strains. Adenoviruses cause a reduction in shell density and a sandy texture at the poles of the shell. Checks can rise to above 10 percent for a two to three week period. Fortunately, pullet flocks are usually exposed to adenovirus during rearing due to inherent deficiencies in bio-security, resulting in flocks which are



**Fecal deposits on eggs cannot be removed without leaving residual stains on shells.**



**Defects include yolk stains (middle egg) and thinning of the shell leading to cracks and leakers**

by periodic “boosting” using an appropriate IB vaccine.

Even in immunocompetent flocks, a low level of protection can be caused by defective administration of vaccine. In evaluating the results of ELISA assays, it is necessary to establish that the geometric mean titer is consistent with protection. In addition, the

exposure to IBV during the early stage of the first production cycle. Affected hens will continue to produce eggs with shells of suboptimal quality after challenge.

*Respiratory Adenovirus* - Adenoviruses are ubiquitous and if susceptible flocks are exposed during the production period, shell defects will occur. Generally, exposure to

naturally immunized before transfer to laying houses.

*Newcastle Disease* - Newcastle disease (ND) can result in defective shells. Velogenic NDV strains are associated with rapidly rising severe mortality and respiratory or neural signs with virtual cessation of egg production. VVND together with exotic



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# A Well-Executed Rodenticide Rotation Program Eliminates Rodent Infestations, Keeps Birds Healthy

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Norway Rat

## A recommended practice

Rodents are a problem in the poultry industry as they take up residence in breeder, broiler and layer houses transmitting disease, causing building damage, and contaminating and consuming feed and water.

Rotation is a recommended biosecurity practice to avoid resistance related to rodent behavioral traits, or the rodents' potential dislike for any combination of flavor, texture, or shape of bait formulations.

Anticoagulants and acute toxicants (non-anticoagulants) are the baits most often used for a rotation program. Some anticoagulants are single-feed and effective within several days. Acute toxicants, meanwhile, are all considered single-feed because rodents typically stop feeding after one meal. If a lethal dose is ingested, rodents usually die within 24 hours. However, acute rodenticides tend to be less palatable due to their higher level of active ingredient.

## Selecting rodenticides

Rodenticides need to be formulated for high palatability and acceptance. Single-feed anticoagulants, such as Hombre™ (with the anticoagulant difethialone) or Boothill® (with the anticoagulant bromadiolone) require a lower amount of active ingredient. They deliver a lethal dose in one feeding to provide a fast kill, but not so fast as to trigger bait shyness.

Multiple-feed anticoagulants often require rodents to feed multiple times in order for a killing dose to be consumed. An acute toxicant in the rotation, however, helps control rodents' resistance to multiple-feed or single-feed anticoagulant rodenticides. Additionally, rodents typically stop eating after a single lethal dose, saving both money and bait. Gunslinger™ from Liphatech, Inc., for example, contains a high concentration (100 ppm) of the neurotoxin bromethalin for a quick knockdown of an infestation.

Regardless the active ingredient, it must be effective against all commensal rodent species, including mice, Norway rats and roof rats. Rodent infestations also require different baiting techniques. This is the primary reason for a variety of formulations, which typically include blocks, bulk pellets, and pellet place packs.

For more information about Liphatech or any of its products, call (888) 331-7900 or visit [www.rodent-control.com](http://www.rodent-control.com).

## A two-phase process

A two-phase rodent control process is essential to a well-executed biosecurity rotation strategy. It involves an intensive treatment during cleanout, followed by routine treatment to maintain rodent control.

Rodenticide rotation as part of the approach means switching between an anticoagulant and a non-anticoagulant. Simply switching products or brands, however, is not considered rotation. Instead, use of one type of anticoagulant, such as one containing difethialone (Hombre), for six months. Then switch to an anticoagulant rodenticide containing bromadiolone (Boothill) for another six months to provide different active ingredients and flavors. An acute toxicant with bromethalin (Gunslinger) can then be used during the cleanout phase. The cycle repeats as part of an ongoing program.

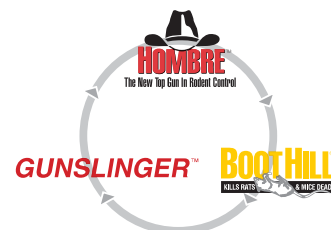
The best time to conduct intensive treatment is during cleanout when the flock is out of the house. Before this, all areas of the house should be inspected for evidence of rodent activity. Place rodenticides wherever droppings, tracks or rub-marks are found.

Bait stations should always contain an ample supply of rodenticide. Maintain a constant supply of Gunslinger rodenticide for as long as the birds are out of the house. Move uneaten bait to areas where bait is being consumed.

Before the flock is reintroduced to the house, all uneaten rodenticide must be collected. Another good biosecurity practice is to wash down the facility with disinfectant and water to further assist in disease prevention and control.

Once the intensive treatment is complete and the house is restocked, implement, or rotate to, a single-feed anticoagulant (Hombre) to prevent re-infestation. This routine treatment involves rodenticide placement both inside and outside of the facility. Keep all rodenticides away from areas where the birds can reach them, or where they may fall among the birds when the rodents feed.

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## | Shell Defects |

Highly Pathogenic Avian Influenza require rapid diagnostic intervention and control measures which are a federal responsibility. Lentogenic Newcastle Disease virus, which is ubiquitous, is seldom a cause of problems in the United States as flocks are generally well protected by vaccination and exposure to the mild virus during rearing.

### Flock Age

Shell density will decrease with progressive age with obvious deterioration after 65 weeks. This is associated with increased egg volume and a concurrent decrease in the efficiency of active deposition of mineral nutrients into shell structure in the terminal part of the oviduct. Adequate nutrition with appropriate adjustment of calcium and available phosphorous levels, and control of ambient temperature, are more critical in older flocks than during the early phases of the production cycle. Recognizing the inherent problem of age-related deterioration, producers of specialty eggs discriminate against older hens and select flocks for production of eggs with acceptable quality.

### Genetic Factors

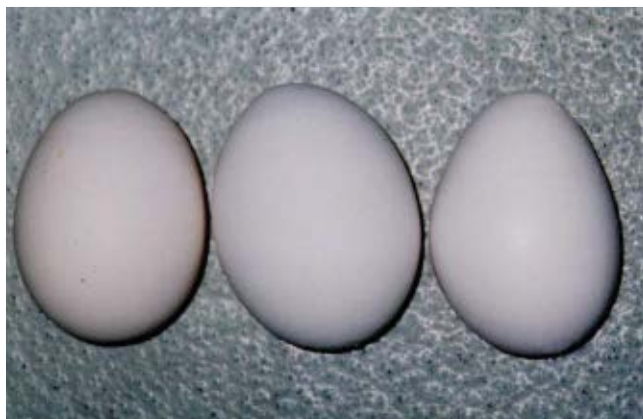
The major primary breeders incorporate parameters associated with shell quality in their programs of index selection. Despite the emphasis on shell strength, some strains are more suitable for in-line breaking as they produce eggs with enhanced yield of solids and have shells with less desirable characteristics compared to competitive strains.

### Shell Soiling

Generally, fly specks are removed by washing using commercial equipment operated in accordance with the manufacturer's recommendations. Specking should be resolved by suppression of fly breeding, which requires an integrated approach including frequent activation of manure belts, scraping manure boards, frequent flushing of lagoon systems or adequate ventilation of pits coupled with strategic use of insecticides and larvacides. Fecal staining is frequently encountered in old cages with sagging floors which reduces roll-out. Older cages are frequently associated with rust stains. If soiling cannot be removed by washing and if eggs with soiled shells are not eliminated by the dirt detector, consideration should be given to replacement of cages or conversion of an old house to a floor system.

A short-term and sudden increase in fecal staining may be associated with high ambient temperatures, causing hens to increase their intake of water with both diuresis (excessive urine production) and excretion of fluid feces. Restriction of water intake is counterproductive, especially since the basic cause is elevated temperatures and increased water intake is a necessary adaptive response. Adjustment of

ventilation rate and activation of evaporative cooling, if installed, is required during summer months. Excessive fecal soiling may be due to increased salt intake and appropriate evaluation of formulations



Defects include rough texture (middle egg) and eggs with abnormal contour (right).

and analyses of diets should be carried out as accidental over-addition of salt is sometimes encountered. Feeding naturally contaminated limestone with high levels of magnesium sulfate will result in diarrhea. The problem is obviously complicated in cage systems where floors sag or if slope is less than 5 percent, inhibiting roll out onto the belts.

### The Bottom Line

Shell defects can be costly in terms of diversion to breakers, store returns, goodwill and loss of brand image. Diligent diagnostic procedures are necessary to identify both primary and contributory causes of breakage in order to guide selection of appropriate corrective measures. **EI**

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St. Paul, Minn. Contact: Midwest Poultry Federation, 108 Marty Drive, Buffalo, MN 55313. Tel: (763) 682-2171. Fax: (763) 682-5546. E-mail: lara@midwestpoultry.com. Website: www.midwestpoultry.com.

### 3-6: PEPA Annual Convention

Palm Springs, Calif. Details from Pacific Egg & Poultry Association, 1521 I Street, Sacramento, CA 95814; E-mail dmurdock@cgfa.org; Website www.pacificegg.org.

### 5-6: Environmental Management Seminar

Embassy Suites Hotel, Atlanta, Ga.. Details from U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, GA 30084-7303; Phone (770) 493-9401; Fax (770) 493-9257; Website www.poultryegg.org.

### 5-6: Nebraska Poultry Industries Annual Convention

New World Inn & Conference Center, Columbus, Nebr. Details from Nebraska Poultry Industries, Inc., University of Nebraska, A103 Animal Sciences, P.O. Box 830908, Lincoln, NE 68583-0908; Phone (402) 472-2051; E-mail Egg-turkey@unl.edu.

## APRIL

### 14: European And American Perspectives On Poultry House Environment

Kreider Farms Restaurant, Manheim, Pa. Details from Patricia Burns, De-

partment of Poultry Science, The Pennsylvania State University, 213 Henning Building, University Park, PA 16802; Phone (814) 865-5573; Fax (814) 865-5691; E-mail plb8@psu.edu.

### 17: Delmarva Poultry Industry, Inc. Booster Banquet

Wicomico Youth and Civic Center, Salisbury, Md. Details from Lori Morrow, Phone (302) 856-9037; Website www.dpichicken.com; Email morrow@dpichicken.com.

## MAY

### 8-9: National Breeders Roundtable

Airport Marriott Hotel, St. Louis, Mo. Details from U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, GA 30084-7303; Phone (770) 493-9401; Fax (770) 493-9257; Website www.poultryegg.org.

### 12: Poultry Management And Health Seminar

Kreider Farms Restaurant, Manheim, Pa. Details from Patricia Burns, Department of Poultry Science, The Pennsylvania State University, 213 Henning Building, University Park, PA 16802; Phone (814) 865-5573; Fax (814) 865-5691; E-mail plb8@psu.edu.

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