

Egg Industry

News for the Egg Industry Worldwide

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Midwest Poultry Services Looks to the Future



Photo: Gary Gerard.

Bob Krouse, President of Midwest Poultry Services, thinks the industry is likely to remain profitable overall during the next three years.

By Edward Clark, Editor

Like many egg companies in 2007, this is not a year of expansion for Midwest Poultry Services, L.P. "Our goal is to keep the flock size where it's at," says Bob Krouse, president of the Mentone, Ind., firm.

While having no growth plans for the near term, longer term, Krouse says that companies like his—one of the nation's top egg companies with 6 million layers—will have to grow to match the needs of expanding customers. But not for a while, and not before some major industry issues are worked out.

Besides Indiana, the company has operations in Illinois, and Ohio, "where the feed markets are," says Krouse, who has been with the company for 24 years.

Animal Welfare Deters Industry Growth

Krouse is optimistic on profits in the near term. "Overall, I think the industry will be profitable over the next three

years," he says. One big reason why is animal welfare. He, like others in the industry, are reticent to spend the \$2 million to \$4 million necessary for a new layer house, not knowing what his customers may demand on how eggs are produced.

Closely related, he says, is the capital outlay Midwest Poultry Services has invested over the past 5 years to increase cage space from 52 sq. in. to 64 sq. in. to meet new United Egg Producers animal welfare guidelines. Such shifts significantly contribute to why there was no surplus in eggs this summer, and strong

profits for egg producers nationwide.

A big question surrounding the cage-free issue, Krouse says, is whether the marketplace or animal rights activists determine its outcome, and it's uncertain how customers will ultimately weigh in on the issue. What is certain, he says, is that the issue will keep egg producers cautious.

Market for Eggs Growing

"I think the market for eggs is growing and retailers will let their customers decide. Most will have a selection available. I can't see the 5 percent animal welfare activists denying 95 percent of a good inexpensive protein." He adds that he continues to believe that egg consumption will keep growing, "and that the American Egg Board is doing a good job to accomplish that."

Other issues keeping producers cautious about expanding are regulatory concerns, such as the environment, and current high feed prices coupled with an unknown demand caused by the emerging ethanol market that, he adds, "keeps people on the ropes a little."

It's been harder this time around, Krouse says, "to produce our way out of profitability like we did in 2004." Regarding the strength of egg prices, he

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continues, "We've been fortunate this year."

Despite Midwest Poultry Service's caution on growth now, its expansion has been impressive since its inception in 1968. The company began with 300,000 layers, created as a business



Bob Krouse says that the animal welfare issue, regulatory issues, and high feed costs are making the industry cautious on expansion.

for a feed company that was started in 1875. "Our company has evolved and changed as the egg business has," Krouse states.

Dramatic increases in corn and soybean prices notwithstanding, the company's commodity risk program has remained the same. It buys from local sources wherever possible. "If \$2/cwt or \$4/cwt, corn still will be 55 percent to 60 percent of the ration cost," explains Krouse.

Industry Needs to Get Creative

The industry, Krouse says, "has taken things about as far as it can on production efficiency. Now we have to get creative and take whatever the next step is." In his view, that includes packaging.

"When you go to the food packaging expo in Chicago, you see a lot that can be adjusted to our industry." **EI**

INDUSTRY NEWS

► Humane Society's Latest Target: Wendy's

The Humane Society of the United States (HSUS) has criticized Columbus, Ohio-based Wendy's for not using cage-free eggs.

"Wendy's should do the right thing and start using cage-free eggs as it expands its breakfast menu," says Paul Shapiro, senior director of the HSUS's factory farming campaign. "There's no reason that it shouldn't at least meet the moderate improvements Burger King has implemented," he says.

The HSUS, a Wendy's shareholder, recently initiated an ad campaign including print and radio spots urging Wendy's to follow the lead of Burger King and begin phasing in the use of cage-free eggs.

In March, Burger King committed to using 5 percent cage-free eggs by the end of 2007.

Wendy's says it is choosing to work with animal welfare experts on different cruelty-free guidelines rather than weigh in on the cage-free debate, an Associated Press article says. Wendy's states that it is very committed to the humane treatment of animals.

► Newspaper Comes to Eggs' Rescue

In June, the Center for Science in the Public Interest attacked egg companies for promoting their eggs' Omega-3 health content because, in the group's view, eggs are high in cholesterol. But eggs just may be considered a healthy delivery system, according to an article in last month's *Los Angeles Times*.

The article says that the confusion over blood cholesterol and dietary cholesterol may have resulted in eggs getting a much worse reputation than they deserve. Eggs

are inexpensive, full of protein and contain high levels of lutein and zeaxanthin, which may protect against blindness from macular degeneration, the article says.

In addition, the article cites a study by Harvard University researchers and funded by university and federal money that found one egg a day does not increase the risk of heart disease in healthy people.

At present, the American Heart Association recommends that people with no risk of heart disease consume less than 300 milligrams of dietary cholesterol daily and people with diabetes, heart disease or elevated LDL levels, consume less than 200 milligrams per day. These guidelines are reviewed every 10 years, most recently in 2000, which means that eggs could come up for review in 2010.

A single egg contains about 213 milligrams of dietary cholesterol.

► In U.K., No Vegetarian Symbol for Mars Bar

In the United Kingdom, the Vegetarian Society has denied the request of Masterfoods, maker of the Mars candy bar, to use the 46-year-old seedling symbol. The reason: the company still uses eggs from hens raised in battery cages.

"We are pleased that Masterfoods has recognized the importance of labeling to its vegetarian customers," the society's CEO Annette Pinner told BBC News. "However, it is important for consumers to recognize the difference between minimum vegetarian standards and the higher criteria associated with Vegetarian Society approval."

In May, Masterfoods dropped plans to use animal-based whey rennet after receiving 6,000 customer complaints.

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Traceability: Very Important, but Analyze Costs

By Dr. Simon M. Shane

Traceability is recognized as an important issue in all aspects of production, marketing and international trade in products derived from intensive animal production systems.

Public health episodes including Bovine Spongiform Encephalopathy (BSE) in cattle, PCB, and dioxin contamination of ingredients, E. coli 0157: H7 infection associated with processed ground beef and the most recent incident involving melamine contamination of pet food,

program is critical to rapidly identifying the source of infection in epidemiological investigations of food borne disease outbreaks.

A further component more recent and specific to the United States involves agro-bioterrorism. One U.S. producer has made claims relating to superior safety associated with eggs individually etched with a code.

In assessing risks associated with deliberate adulteration or tampering of the food supply, eggs can be regarded as

investigation associated with product recall.

Education of Stakeholders

Any system requires education of the various stakeholders involved in production, distribution and marketing through to the consumer. Systems which are mandated by law and are uniform in their presentation are generally accepted by consumers. Introduction of innovative systems requires promotion and education at both point of sale and in the media and may not be perceived as an advantage or a benefit, especially in nations with a low prevalence of SE.

Generally, in the United States, consumers place considerable importance on the USDA seal. Although this designation relates to grade and quality, there is a general misconception that eggs derived from a plant under USDA inspection are wholesome and free of contaminants or pathogens.

Shell eggs may be imprinted with logos to identify branded product with specific attributes. This is not strictly traceability but rather product differentiation. Consumers are provided with an assurance that marked eggs conform to brand specifications, which may include superior nutritional content or indicate that the eggs have been subjected to a process such as in-shell pasteurization.

Marking technologies available today vary in their levels of sophistication, capabilities and costs (see sidebar).

The Bottom Line

The industry should guard against introduction of non-beneficial innovations or mandated adoption of sophisticated technology. New systems will require capital expenditure and purchase of consumables to achieve real or perceived advantages, which may not be commensurate with cost. In the event of an egg borne disease outbreak, current imprinting can identify the plant of origin and

▶ **Liquid bulk product such as milk, ice cream, juices or pasteurized egg liquid are more likely targets for deliberate adulteration than whole shell eggs.**

have all contributed to intensive concern over traceability.

The European Union (EU) has been especially active in formulating regulations to protect consumers. Recognition of the high incidence rate of SE among member countries of the EU has resulted in a series of directives regarding traceability from farm of origin to point of sale.

Directive 2002/4/EC mandates compulsory identification on each shell egg effective Jan. 1, 2004. With variations in member nations, eggs are imprinted with a unique code which specifies farming method (organic, free-range, non-confined or caged), country of origin, farm ID, and a "use before" date. In addition, producer associations or individual plants apply logos for promotional purposes.

Trace-Back Program Critical

Apart from legislated identification, a number of food marketing companies in various countries require imprinting, including ECO and other major food chains in Japan. It is evident that identification as a component of a trace-back

fairly insignificant since tampering of packed shell product would be time consuming and limited in impact. Liquid bulk product such as milk, ice cream, juices or pasteurized egg liquid are more likely targets for deliberate adulteration than whole shell eggs.

Components of Traceability Systems

The primary requirement for a trace-back system involves a coded sequence of numbers or digits on each pack or alternatively on individual eggs. The method of application is determined by available technology, cost considerations, durability, susceptibility to fraudulent change, legibility, and compatibility with the shell.

A database is the second component of a traceability system. Consumers and investigators should be able to access records to track product through the various stages of production extending from the farm through processing, including imprinting, storage, transport, distribution, and ultimately to display at point of sale. Traceability involves both trace-back to origin and trace-forward

open dating allows consumers to recognize expiration dates.

It is important for every plant to maintain internal records for feed mill operation, flocks, and processing that can be applied in the event of a trace-back for a pathogen or contaminant. Incremental advances in technology are necessary in printing on cartons and possibly eggs to ensure legibility.

Both HACCP and SSOPs should incorporate protocols for trace-back and recall. Given the current situation in the U.S. industry, an SE outbreak that is diagnosed and confirmed through the FoodNet will initiate an investigation by the FDA. More complicated or extensive episodes such as contamination of a feed ingredient common to a region will involve more extensive trace-back, which occurred in the recent incident involving melamine contamination of mislabeled imported ground wheat incorporated into pet food.

Available Imprinting Technology

Rubber Stamping

Eggs can be imprinted with an ink impression using a rubber stamp. This simple technology applies a logo identifying a brand or the "U.S." for export, on each egg after cartoning and before closure of the lid. There is no capability to apply unique serial numbers.

In U.S. plants subject to USDA inspection for interstate shipment, cartons are stamped with the packing date, the plant number assigned by USDA, and the "use by" date. To promote internal plant quality control, some processors may apply a packer number.

In the event of a food borne infection, the carton, which may or may not be available at the time of investigation, will provide the most elementary data

aging material (fiber, foam, or plastic) may affect legibility.

Ink Jet Printing

Commercial jet printers can apply the three required items in addition to time of packing to cartons. This additional feature allows more precise identification of source flocks if plant records correlate time of packing with the origin of eggs.

Available trace-back technology include rubber stamping, ink jet printing, laser etching, and radio frequency identification.

used to initiate a trace-back investigation. In most well-managed plants with HACCP and trace-back systems in place and that pack off-line product, a paper trail will identify the most probable flock of origin. With in-line units, it is invariably impossible to identify individual flocks responsible for an incident but investigations to determine the possible presence of SE infection by screening individual units can be initiated on the basis of carton information.

A problem relating to rubber stamp imprinting of cartons relates to the readability of the three items of information. Defective stampers, improperly adjusted packers, incompatibility of ink with the surface texture of pack-

Records are required to relate operation of in-line conveyors transferring eggs from specific flocks to the plant or identifying individual consignments of eggs when packed off-line. Hitachi supplies the KX series of printers operating with continuous ink jet technology.

An advantage of the system is the capability of printing clearly on uneven surfaces and the accommodation of cartons with rounded ends. Although not in commercial use, continuous ink jet printers have the ability to apply a barcodes to cartons. Generally, bar codes are applied to labels then attached to boxes primarily for inventory control rather than product traceability. The Hitachi KX printers offer flexibility in print characters in either 2- or 4-line



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configurations using a 65 micron nozzle. Currently, cost is a significant constraint to general adoption since each unit, including controller and print head, costs approximately \$12,000, compared to the \$50,000 total cost of a modern packer equipped with a rubber stamper.

Ink jet printing can also apply logos to individual eggs. Domino of the United Kingdom supplies the A-Series egg coder for Moba, Staalkat, and Diamond graders together with compatible software. Models are approved for use in USDA-inspected plants and ink conforming to FDA specifications is available. The most recent Domino A-300 series is encapsulated in a stainless steel enclosure and these models have a molded keyboard which is used to select logos, farm and plant codes, and dates. A number of supermarket chains in the United States require imprinting of individual eggs both for traceability and as an assurance of brand identity in addition to product differentiation.

Due to the position of the print head in relation to the baskets in the transfer conveyor of the packer, ink jet printing can only be applied to the side of the eggs. The logos and imprinting are not completely visible to consumers when eggs are placed in cells. Rubber stamping, in contrast, places the logo on the large end of the egg that is uppermost when the lid of the carton is opened.

developed based on ink jet printing of shells. The system is appropriate to the Canadian industry, which has over 1,000 producers with 19 million hens in small flocks (from 10,000 to 20,000 birds) supplying packing plants which operate off-line. Consumers can access data on their purchased eggs using a database operated by the developers of the system.

Laser Etching

Based on initial trials in 1998, EggFusion Inc., in Deerfield, Ill., was established in 2002 to market a system to etch product identity and traceability data on eggs using laser technology. The laser etches the palisade layer to a depth of 50 to 90 nanometers, approximately 5 percent of the thickness of the shell.

Each unit is comprised of a laser generator and an etching head installed on a grader. Three U.S. producers, two in Pennsylvania and one in South Carolina, have installed laser etching systems to service specific supermarkets in the Northeast and a club store.

Etching for the club store requires an "F & T" code which includes a four-digit designation of the plant including the initials of the retailer and the expiration date. It is understood that the client pays a royalty of 2 cents per dozen for the service and EggFusion supplies the installation and an opera-

egg, the date of packing, and the expiration date, however this information is clearly visible on cartons bearing the USDA seal. Subsequently, etched eggs have appeared in the marketplace without the unique numeric code so it is assumed that this feature was found to be impractical or have insignificant commercial application.

Subsequent to the launch of the EggFusion process as a traceability and safety feature, the promoters of the system revealed a business plan which involved sale of advertising and corporate logos on eggs. In September 2006 the CBS network arranged for 35 million eggs to be imprinted to promote their fall program line-up. This experimental use of eggs as "oval billboards" was apparently ineffective since there has been no further adoption of the technology for promotional purposes.

Radio Frequency Identification (RFID)

RFID is a method of electronically imprinting and retrieving data from tags attached to products or cartons. The tags are comprised of a small integrated circuit that stores data and modulates a radio frequency signal. They can be read remotely providing inventory control and security information. The second component of the system is an antenna that communicates with a reader.

Although traceability can be achieved using bar code imprinting, when developed more fully, RFID is expected to offer advantages although at an additional cost. Wal-Mart has been the most progressive developer of RFID application, requiring suppliers of 100 products to apply tags.

Problems associated with this technology include variation in standards (VHF vs. UHF), possible constraints to applications associated with privacy issues, complexity and cost. It is possible that with future development, RFID could be used at the carton level to provide positive identification of product as to source, date of packing, and other details. Although data would be available to both producers and distributors, consumers would be unable to verify product identity unless readers became a conventional kitchen gadget. **EI**

It is important for every plant to maintain internal records for feed mill operation, flocks, and processing that can be applied in the event of a trace-back for a pathogen or contaminant.

Both rubber stamping and ink jet printing require a dry shell which is a function of appropriate selection of the temperature of wash and rinse water, surfactant additive in the sanitizer, installation of an OEM high efficiency drier, and possibly accessory drying fans. Diligent management of stamping exceeds the requirements for unstamped and generic eggs when graders with up to 10 packers are operated at a throttle setting of 350 to 400 cph.

The EggsacTrac system marketed by Verified Eggs, Canada, has been

tor. Basically, the imprinting of plant number (incidentally, not the official USDA designation) and expiration date is regarded by the client as desirable but the process offers little advantage in traceability over conventional carton stamping.

Since etched eggs are generics there is little justification for the additional 2 cent per dozen cost. When the etching process was first introduced, it was promoted as a safety feature enabling a consumer to access a computer database to determine the origin of the

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Export Picture Keeps Getting Better

By Edward Clark, Editor

Exports of eggs and egg products continue to have a strong year in 2007, which is one more reason why the year is such a strong one for producer bottom lines.

For the first six months of the year, exports of table eggs were up 139 percent by value and 100 percent by volume compared to the same period in 2006, with egg product sales also strong, up 32 percent by value and 12 percent by volume.

"I've never seen such phenomenal growth in shell egg exports and sustained growth of processed eggs as well," says James Sumner, President of the USA Poultry & Egg Export Council (USAPEEC), Stone Mountain, Ga. Looking at the second half of 2007, he adds: "I don't see any reason why things will change."

Another USEM Sale

On the table egg side, exports are due in large part to sales by United States Egg Marketers (USEM), and the group approved an additional sale last month of 132 container loads of eggs for export starting with delivery the week of August 20, according to the United Egg Producers (UEP). UEP says that never in the past seven years since UEP assumed management of USEM has an export order ever been made at such a high price.

The sale, made at 60 cents per dozen, is 10 cents higher than any previous export.

UEP says that Urner Barry's quote for breaking stock in Europe was 27 cents per dozen higher than a year ago in mid-August, which indicates that there may be a limited supply of eggs for breaking in Europe.

Indeed, it's no exaggeration to say that exports to Europe have skyrocketed, with January-June 2007 volume of table egg exports from the United States up an astounding 6,101 percent compared to previous-year levels, with egg product exports to Europe also strong, up 183 percent.

Why such strong sales to Europe? In the view of Dean Hughson, director of

boosted sales of eggs and egg products to Europe, but former markets served by Europe are now possible

Reasons for Growth

Overall, though, the reasons U.S. egg sales are improving are three-fold: the quality of U.S. eggs, the fact that the United States is the world's low-cost producer, and that United States

Table 1. Top Regional Egg Export Destinations, Jan.-June 2007
In Metric Tons (Table Eggs in Doz.) and \$Million

	Table Eggs		Table Eggs		Vol. change	Val. change
	Jan.-June '07	Jan.-June '06	Jan.-June '06	Jan.-June '07		
East Asia	18.1	10.7	\$6.5	\$12.8	70%	95%
EU-27	9.3	0.1	\$0	\$11.2	6101%	
Middle East	7.7	0.7	\$0	\$2.9	974%	418%
North America	5.8	8.2	\$5.4	\$4.8	-30%	-10%
Caribbean	1.1	0.9	\$0.7	\$0.8	25%	27%
South Asia	0.6	0.4	\$0.3	\$0.6	75%	89%
Total, World	43.7	21.8	\$14.3	\$34.1	100%	139%

	Egg Products				Vol. change	Val. change
	Jan.-June '07	Jan.-June '06	Jan.-June '06	Jan.-June '07		
North America	7,990	7,236	\$18.4	\$29.6	10%	61%
East Asia	7,074	10,378	\$29.6	\$22.5	-32%	-24%
EU-27	4,206	1,486	\$10.2	\$18.6	183%	83%
Total, World	23,665	21,172	\$64.9	\$85.5	12%	32%

Source: USDA

The above table shows that table egg exports from the United States were up 139 percent, on a value basis with egg product exports up 32 percent January - July compared with previous year levels.

marketing for Rembrandt Enterprises, in Rembrandt, Iowa, it's largely the change in Europe to cage-free production, "which has effected the egg industry world-wide." Not only has it

is viewed as a dependable supplier, Hughson says. And the production cost with Europe is widening as that region's producers are shifting to cage-free production, which is more costly,

thus effecting both quantity and price. Hughson adds that he's been in the business for 30 years, and he's seen exports ebb and flow, "and now it's our chance to shine again."

One additional reason for expanded U.S. exports is that when U.S. food and restaurant companies expand overseas, in many cases they look to U.S. production if local production cannot supply their needs on quantity and quality, says Leonard Ballas, president of Ballas Egg Products Corp., Zanesville, Ohio. He adds that the sales are not necessarily staying in Europe, that is, shell eggs could be sold in Europe and resold to other nations. Hughson says that ironically, it is cheaper for a customer to import eggs from the United States than to import eggs from some locations within Europe, due to favorable ocean freight costs.

Other major increases in volume of table egg exports the first half of this year are the Middle East, up 974 percent; South Asia, up 75 percent; East Asia, up 70 percent; and Caribbean exports, up 25 percent.

On the egg products side, in addition to Europe's strong growth, North America exports were up 10 percent, while East Asia exports were down 32 percent. Exports of egg products to Mexico jumped 129 percent the first half of 2007, bringing the nation nearly even with Canada and within \$1 million of Japan.

South of the Border

Mexico is also showing interest in importing U.S. table eggs. More refrigerated table eggs are entering Mexico through the retail trade in cities along the border with the United States. Although there are no significant tariff barriers to shipping fresh eggs to Mexico, the reality is that U.S. eggs are refrigerated from farm to store. Mexican regulations do not require domestic eggs to be refrigerated, but do require products (like U.S. eggs) that are transported under refrigeration when they arrive in Mexico, to be kept under refrigeration. This little catch 22 has successfully kept significant quantities of

U.S. table eggs out of Mexico for years, says USAPEEC's Toby Moore.

Egg products to Mexico are surging, with the country now one of the leading importers of U.S. processed egg products. For years, Japan was the leading U.S. export market, followed by Canada as a distant second, followed by everyone else. The European Union (EU) would occasionally rise as the market of note, but would fall back. Mexico was not even on the radar. That's now changed, Sumner says, in part to USAPEEC promotions supported by the American Egg Board. Not only is Mexico "now nip and tuck with Canada, it could even challenge Japan as the top market for U.S. egg products," he says. The Mexican food and baking industry has been very receptive to hearing about the benefits of eggs and egg products, Sumner states.

Egg Bans Aid U.S.

In other positive developments for U.S. producers: the United Arab Emirates' ban on eggs from Saudi Arabia,

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| Export Picture Keeps Getting Better |

and the re-opening of some doors in India. The Saudi ban and the market's mistrust of Indian eggs due to pesticide concerns, plus low local supply also led to shipments of U.S. eggs to Iraq.

Exports are not up everywhere, of course. Exports to Canada are reduced, and imports from there to the United States are higher, due to the closing

of a Canadian drier plant that caused the surplus eggs to be shipped to the United States.

In addition, "to a certain extent, our exports will slow down," Ballas says. "We've come off a cheap market, and we had a sizeable inventory of dried eggs that we were able to sell off." And he adds that despite high exports to

Europe, sales would be even stronger without the trade barriers that make it difficult for U.S. producers to export to Europe.

Overall, despite major increases in egg exports, there is still a lot of upside potential, USAPEEC officials say, with only 3.3 percent of U.S. eggs exported, far lower than other poultry sectors. **EI**

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➤ RESEARCH REVIEW

Adding a Bacterial Culture Can Lower Cholesterol

Reviewed by Scott M. Russell

An interesting study recently found that supplementation of hens' diets with *Rhodobacter capsulatus* at a level of 0.04 percent significantly reduced ($P < 0.05$) cholesterol and triglyceride concentrations in the blood serum of the chickens by 15 percent and 11 percent, respectively.

Dietary supplementation with *R. capsulatus* lowered the amount of cholesterol and triglycerides in yolks of eggs laid by these chickens by 13 per-

Research parameters

Forty 23-week-old Hy-Line Brown laying hens randomly assigned to four different treatment groups (10 laying hens per group) and fed diets that were supplemented with 0 (control), 0.01, 0.02 and 0.04 percent *R. capsulatus* during a 60-day feeding period.

cent and 16 percent, respectively, over a 60-day feeding period. Cholesterol and triglyceride concentrations in blood serum as well as egg-yolks were changed linearly in accordance with increasing levels of dietary *R. capsulatus*.

—Continued on p.17

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Boom Continues for Non-Confined Laying Systems

By Dr. Simon M. Shane

Production of eggs from non-confined (NC) flocks has increased rapidly in the United States during the past 5 years. It is estimated that approximately 15 million NC hens are now producing either conventional or organic product. Eggs are marketed as specialty brands based on housing sys-

tem, all vegetable diets, and nutrient enrichment.

Although specialty eggs generate a premium over generics, additional costs are incurred in production and for the efforts expended in attaining high standards of quality. Production of eggs from NC systems is now undertaken by the nation's largest egg

producers and volume, increasingly derived from commercial operations, is no longer confined to small-scale family farms.

Due to the consumer demand for eggs from NC flocks, product is now offered in upscale gourmet and boutique grocery outlets as well as mainstream supermarkets and club stores.

Available Aviary Systems

Farmer Automatic

The Farmer Automatic (www.farmerautomatic.com) system supplied by Josef Kuehlmann of Germany and the similar Salmat installation can be purchased as turnkey units. These incorporate multi-tier perch modules with feeders and drinkers, nests with center or side belt egg collection, plastic slats, and manure belts to remove excreta.

The design of houses must be compatible with an aviary installation with respect to floor dimensions, ceiling height, insulation, ventilation rating, and illumination. Stocking density ranges from 1 ft.² of combined floor and perch area to 1.2 ft.² to 1.5 ft.² required for production of organic eggs, depending on the certifying agency requirements.

Location of communal nests, illumination and the plastic slats forming an apron to the entry of nests is critical to reducing or eliminating floor-laying especially at onset of production. Most aviary systems have electric shock wires installed adjacent to longitudinal walls and in corners to discourage nesting by broody hens. The communal nest modules require an appropriate slope towards the collection belt to ensure rapid roll away after lay. Hen excluders are necessary to eject broody hens

and birds with a low peck order, which congregate in nests, limiting access by producing hens.

Salmat

Salmat of Germany (www.salmat.de) offers both welded wire and plastic slats for easy assembly and their systems can be supplied with or without manure belts to suit a variety of house configurations and local production requirements.

Jansen

Jansen of Holland (www.jpe.org) supplies aviary systems with two and three-tier perches fitted with feeders and nipple drinkers. Generally a 50-60 ft. wide house will have three rows of perches and two rows of communal nests arranged in a back-to-back configuration with center belt egg collection.

Big Dutchman

The Big Dutchman (www.bigdutchman.com) Natura multi-level aviary system can be supplied in several configurations depending on the width of houses. The floor of the house usually serves as a scratch area on litter to conform to European Union requirements. Corridors between nest installations and perches are covered with plastic slats.

Communal nests are provided in two designs. The plastic sheet ejection system is used in the original Colony nest but the Colony 2+ is supplied with a patented tilting floor to close the nest. Perches are specially designed to encourage hens to face forward into the corridors so that feces can be collected onto plastic belts. Specific location of illumination and nipple drinker lines encourages hens to lay in nests.

Plastic slats used with the Integra Natura Aviary system provide maximum traction without sharp edges or corners, maintaining the integrity of foot-pads. Slat design is always a compromise between hen comfort and ability to transfer feces to belts, preventing soiling of feet and fecal contamination of shells.

On-belt manure drying, adapted from conventional cage systems reduces ammonia and if manure is removed at 5-day intervals, the problem of fly infestation is virtually eliminated without the use of insecticides.

Aviary systems are compatible with two-story buildings, optimizing use of available land. In the case of organic production, provisions must be made to allow hens housed in the upper level access to the exterior either on verandas or ramps that descend to ground level.

Currently four alternatives are used to house non-confined egg production flocks:

► Conversion of surplus or obsolete broiler breeder houses, especially in the Southeast and the Mid-Atlantic states.

► Installation of floor systems in existing houses following removal of old unserviceable cages.

► Erection of new units incorporating conventional floor systems with mechanical egg collection, usually undertaken by owners of large enterprises.

► Establishment of new units equipped with sophisticated aviary installations. Logistic and capital cost considerations usually require direct company ownership.

Considerations for Non-Confined Flocks

At the present time, maintaining an adequate supply of eggs from NC flocks to balance demand from the marketplace results in instances where producers may compromise on housing and equipment. This will adversely affect quality or even food safety and is contrary to establishing an acceptable image for a brand.

Most small NC flocks, especially those housed in converted broiler breeder units, are owned and operated by contractors. This requires product to be held on farms and transported to plants for off-line processing. With the advent of aviary systems, which offer high stocking density relative to floor area, it is possible to develop operations that offer the cost advantages, quality and

► ***Production of eggs from non-caged systems is now undertaken by the nation's largest egg producers and volume is increasingly derived from commercial operations and is no longer confined to small-scale family farms.***

ease of management associated with conventional in-line cage complexes.

The most important determinants in the design of housing and selection of equipment include return on investment, labor efficiency, quality of product, and flock welfare. In the case of

Retrofit Installations

An extensive range of equipment is offered by the major manufacturers to convert cage units to NC production. Slats are available from Big Dutchman, Jansen, and Chore-Time. It is essential to select a slat system that is compatible with manure collection since both components manufactured by a single supplier will have a common configuration. In some areas of the United States, traditional wooden slats can be used since these are economical and relatively easy to install. Generally, wooden slats are used in retrofitted houses with collection of manure in pits.

Efficient and functional nest systems are critical to reducing the proportion of floor eggs and maintaining production of clean shells. To optimize space, nest installations are placed longitudinally in the house in a back-to-back configuration. In some houses nests can be located on the longitudinal walls. Eggs can be collected either by roll-away to the center or to the front of the nest. The latter configuration requires a cover which is usually hinged to allow access to belts. Perforated plastic egg belts reduce shell contamination but many systems use conventional fiber or solid plastic material.

organic production, compliance with the rules of the National Organic Program requires certification of facilities

and procedures by an approved agency, placement of organic pullets and purchase or mixing of feed containing only certified organic ingredients.

High Initial Capital Cost

Aviary systems developed in Europe

Vencomatic

Vencomatic (www.vencomatic.com) supplies nests with both configurations and floors are hinged for self cleaning and to eject hens at predetermined time intervals. Vencomatic supplies nests with the patented Vencomat nest floor with a pad with raised rubber "fingers."

Chore-Time

Chore-Time (www.ctbinc.com/egg.htm) nest systems are modular in design and are available in rear roll-out or single front roll-out configuration. Nests incorporate a power activated hinged top to inspect the interior of nests and an automated expeller is installed, which can be operated either manually or by a time clock. Chore-Time supplies woven wire entry ramps and AstroTurf pads for their 4-ft. modules which clean the feet of hens before entry into the nest.

Jansen

Jansen Premium (www.jpe.org) nests are constructed of plywood with plastic partition walls. The durability of plywood and the ability to disinfect units may represent a challenge to decontamination compared to units fabricated from galvanized metal. Jansen nests incorporate a perforated plastic mat to reduce contamination of shells.

during the late 1980s, are compatible with an in-line configuration. The relatively high initial capital cost, which is offset in part by high density relative to floor area, makes this system attractive to existing integrators expanding into specialty egg production. It is estimated that a unit holding 25,000 hens would incur an expenditure of \$300,000 for mechanical installations, feeders, watering system, mechanical nests, conveyors, and ventilation.

The additional cost for the house might range from \$100,000 to \$200,000 depending on configuration, construction materials, services, and insulation. The capital cost per hen housed could extend from \$16 to \$20 depending on selection of equipment and the design of the facility. Assuming depreciation

Boom Continues for Non-Confined Laying Systems |

of the building at 10 percent per annum, and 15 percent on mechanical equipment, interest at 5 percent and allowing provisions for maintenance, the annual fixed cost compo-

nent of production would approach \$90,000 representing a value of 12 to 14 cents per dozen at 80 percent flock production.

The cost of a retrofitted nest installation, lighting, feeders, slats and other upgrades in a suitable existing building would be in the region of \$75,000 for a flock of 9,000 to 10,000 hens. In the case of the conversion the annual fixed cost would be approximately \$20,000 representing 8 to 10 cents per dozen. If units are established at a distance from the plant, additional costs would be incurred for transport and breakage in transit.

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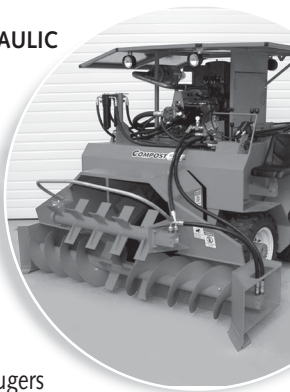
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Loss Problems

Extensive losses may occur in NC units as a result of extensive soiling of eggs, especially in units with insufficient or poorly designed nests and slats leading into nests. Laying on litter or slats may become a consistent problem in some NC units resulting in additional labor costs for manual collection, decreased yield from shell damage and direct loss of eggs into the pits.

General Considerations

Replacement pullets for NC systems should generally be raised on either litter or slats using feeding and watering installations similar to those installed in laying operations. This avoids problems of adjustment when flocks are transferred to laying houses. Incompatibility of rearing and feeding systems may be reflected in post-transfer mortality due to dehydration, injuries from competition and weight loss due to inability to adapt to a new feeding system. As with the caged flocks, optimal uniformity and live weight consistent with strain standard is critical to attaining standard production and persistence.

Prompt removal of floor eggs from slats and litter during the four weeks following the onset of production will reduce the persistence of the problem and contribute to gathering a high proportion of eggs with clean shells. The additional labor required is a worthwhile investment as contractors and processors benefit from higher yield of saleable eggs.

As the demand for egg from NC flocks increases, more aviary and retrofit installations will be purchased. Conversion of old broiler breeder houses may continue in the Southeast and the Mid-Atlantic States, but the deficiencies of these units and the fact that they are operated by small-scale contractors will generally disfavor this approach to expansion. Over the long term, NC eggs will be supplied from company-owned facilities operated as in-line operations offering economies of scale.

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Food Safety Concerns in China

Boost Demand for Premium Foods

By Terry Evans

It might sound strange, but the outcome of Avian Influenza (AI) outbreaks in China has been a breath of fresh air for food processors. The government and urban consumers now hold food safety as a concern, increasing the demand for premium foods produced with safe ingredients.

“Other positive results from the AI outbreaks and the related negative publicity have been demands for more product information through labeling,” Morten Ernst, Sanovo International, said at the International Egg Commission conference in London.

The Chinese government has recognized the importance and neces-

well as the World Fair in Shanghai in 2010, there is still a fear of the potential nightmare scenario of what a livestock disease outbreak that could affect humans might do, Ernst said. Beijing has set up an expert panel on food security, he noted.

Established Regulations

Although established regulations are many steps away, guidelines of processing egg products are already in place. With most of the international food processors in China using pasteurised egg products, the current government’s challenge is to urge local food processors to also use pasteurised egg products for the safety of the consumer.

Ernst said that large food companies are being encouraged to work with farmers to grow products or breed poultry and produce eggs under a unified set of standards and quality control mechanisms. There are national and local standards, and many producers have their own. Multi-national food processors often have their own specifications and requirements for the ingredients they buy - including eggs and egg products.

The central government is implementing a “safety guaranteed foods” policy, under which only foods from designated processing facilities are allowed into the retail channel. “This will force food processors to improve their production methods and their selection of raw materials, and should increase the demand for high quality processed egg products,” he said.

More than 60 percent of the country’s urbanites were willing to pay more for produce certified safe or organic, Ernst added. Wal-Mart started selling organic products in all of its Chinese stores

— now totalling 71 — in 2005. As a result, egg sales rose 50 percent in the 12 months through to November 2006.

China has about 14 egg product plants in operation, with another three starting up this year. The existing plants had a combined annual egg breaking capacity of 90,000 tonnes, which will grow to about 110,000t when the three additional plants start up.

A few of these 17 processors are integrated, with two of them operating their own feed-mill and million-bird layer farms. Both of these were planning large expansions of layer capacity as well as increased egg products capacities. Of the remainder, some have strict control of both feed and layers through contracts, while others bought their eggs in the open market, direct from farms or through egg traders.

Almost all process egg powder, mostly whole egg, with most of the powder going to the huge noodle and bakery industries.

Pasteurized Egg Products

Ernst said that throughout Asia, concerns over AI have resulted in most local food processors showing increased interest in pasteurised egg products and egg powder.

To make the food industry change from fresh eggs to using products was a massive challenge in countries where food regulations, and food safety were either not established or in their infancy, he said.

“The thinking which has made egg products popular in the developed world is not yet a factor in Southeast Asia. Labor is cheap, hygiene is often not a concern, and convenience does not matter,” he said.

Ernst added, “The low level of utilization of existing egg products’ processing facilities in China and Asia—excluding Japan—is proof that this industry has a long way to go.” **EI**



Morten Ernst, Sanovo International

sity for food safety by implementing regulations that ensures the consumer higher quality and safer end products. In addition, the food safety bureau is continuing its focus on developing egg handling and processing regulations.

With China hosting the Olympics as

► RESEARCH REVIEW

—Continued from p.10

Increased High-Density Lipoprotein

These results suggest that there was a dose-response associated with this study. The authors also mentioned that supplementation of *R. capsulatus* in the hens' diets increased high-density lipoprotein cholesterol level and decreased ($P < 0.05$) the atherogenic index of the serum of the birds. The color of the yolk was reported to have been improved ($P < 0.05$) in the group fed the 0.04 percent *R. capsulatus* supplemented diet when compared with the control group. The amount of cholesterol and triglycerides in the livers of the chickens was reduced ($P < 0.05$) when the hens were fed 0.04 percent *R. capsulatus*.

In addition, the supplementation of *R. capsulatus* in layer diets did not appear to cause any adverse effects on egg

production, shell weight, shell thickness, Haugh unit, yolk index and feed conversion efficiency when compared with the same parameters for the control-laying hens.

U. Salma, A.G. Miah, K.M.A. Tareq, T. Maki and H. Tsujii; 2007.

Effect of dietary *Rhodobacter capsulatus* on egg-yolk cholesterol and laying hen performance. *Poultry Science*, 86(4): 714-719.

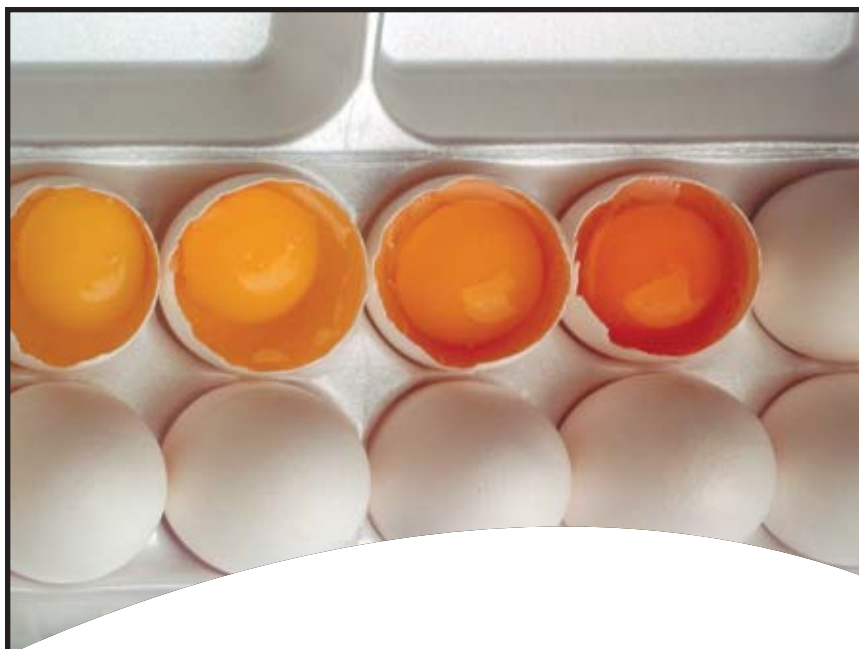
Dr. Russell is Associate Professor of Poultry Processing and Products Microbiology, University of Georgia, Poultry Science Department, Athens, Ga.

► **Cholesterol and triglyceride concentrations in blood serum as well as egg-yolks were changed linearly in accordance with increasing levels of dietary *R. capsulatus*.**

production, shell weight, shell thickness, Haugh unit, yolk index and feed conversion efficiency when compared with the same parameters for the control-laying hens.

Low-Cholesterol Eggs

The authors postulated that known and unknown factors are present in *R. capsulatus* presumably responsible for the hypocholesterolemic effect on laying hens. They concluded that dietary supplementation of *R. capsulatus* may lead to the development of low-cholesterol chicken eggs. This research is es-



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► INDUSTRY CALENDAR

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16-21: International Egg Commission's Annual Conference

Hilton Hotel, Budapest, Hungary. Contact: Julian Madeley. Tel: +44 (0) 20 7490 3493. Fax: +44 (0) 20 7490 3495. E-mail: Julian@internationalegg.com.

October

3-4: National Chicken Council Annual Conference

JW Marriott Hotel, Washington, D.C. Contact: National Chicken Council, 1015 15th Street, NW, Ste. 930, Washington, D.C. 20005-2622. Tel: 202-296-2622. Fax: 202-293-4005. E-mail: ncc@chickenusa.org. Website: www.nationalchickencouncil.org.

2008

January

23-25: International Poultry Exposition 2008

Georgia World Congress Center, Atlanta, Georgia. Contact: US Poultry & Egg Association, 1530 Cooledge Road, Tucker, Georgia 30084-7804. Tel: 770-493-9401. Fax: 770-493-9257. E-mail: expogeneralinfo@poultryegg.org. Website: www.poultryegg.org.

March

18-20: Midwest Poultry Federation Convention 2008

St. Paul, Minnesota. Contact: Midwest Poultry

Federation, 108 Marty Drive, Buffalo, Minnesota 55313. Tel: 763-682-2171. Fax: 763-682-5546. E-mail: lara@midwestpoultry.com. Website: www.midwestpoultry.com.

2009

January

28-30: International Poultry Exposition 2009

Georgia World Congress Center, Atlanta, Georgia. Contact: US Poultry & Egg Association, 1530 Cooledge Road, Tucker, Georgia 30084-7804. Tel: 770-493-9401. Fax: 770-493-9257. E-mail: expogeneralinfo@poultryegg.org. Website: www.poultryegg.org.

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