California Poultry Letter

University of California • Cooperative Extension — September-October 2001

U.C. Poultry Symposium and Egg Processing Workshop

(Both the morning or afternoon program are approved as CEQAP Training)

November 6, 2001
Stanislaus County Agricultural Center
3800 Cornucopia Way
Suite A Conference Room
Modesto, California

November 7, 2001
Chan's Oriental Cuisine
1445 University Avenue
Riverside, California

9:00 a.m.	Registration $35 per person (includes lunch, refreshments and materials) ***Pre-registration is required if you want lunch*!** **Please pay at the door; make checks payable to UC Regents.**
	To register for the Modesto meeting telephone Ralph Ernst 530/752-3513; e-mail raernst@ucdavis.edu or Susan Reichel 530/752-9040
	To register for the Riverside meeting telephone Doug Kuney 909/683-6491; e-mail drkuney@citrus.ucr.edu
Morning Chair:	Modesto Program - Francine Bradley, Extension Poultry Specialist, University of California, Davis
	Riverside Program - Ralph Ernst, Extension Poultry Specialist, University of California, Davis
9:30	Dietary Protein in Layer Diets - How low can we go? Sheila Scheidler, Poultry Specialist, University of Nebraska
10:00	Research on the Association Between SE and Molting - Carol Cardona, Extension Poultry Veterinarian, University of California, Davis
10:30	Break
10:45	Housing of Laying Hens: Coping with EU Regulations - Franz Sommer, Resident, CAHFS, Turlock (Staff Veterinarian, Poultry Clinic, University of Vienna)
11:25	Alternatives for Mortality Disposal - Doug Kuney, Poultry Farm Advisor, UCCE Riverside County
12:00 p.m.	Lunch

Afternoon Chair:	Gideon Zeidler, Extension Food Specialist, University of California, Riverside
1:00 p.m.	Nutrient Enhanced Eggs - Possibilities and Experience - Sheila Scheidler, Poultry Specialist, University of Nebraska
1:30	Update of Shell Egg Processing Costs - Dick Magoffin, Chilson Management Controls, Inc., Rancho Cucamonga, California
2:00	Break
2:10	Reducing Refrigeration Energy and Heating Water With Waste Heat - James Thompson, Extension Agricultural Engineer, University of California, Davis
2:50	Maintenance of Refrigeration Systems - Gordon Follette, Follette Engineering, Modesto, California
3:20	New Methods For Producing Extended Shelf Life Liquid Eggs - Mo Samimi, Food Science and Engineering Consulting, El Cerrito, California
3:50	Adjourn

Dr. Scheidler Keynotes Poultry Symposium

Dr. Sheila Scheidler will be the featured speaker at the 2001 Poultry Symposium. Dr. Scheidler is a well known poultry nutritionist from the University of Nebraska and has published extensive research on the nutrition of laying hens. She is also well known for her research on nutritional enhancement of eggs by dietary changes.

Research on Alternative Molting Methods

In recent years there has been increased concern about molting hens by feed withdrawal. Criticism from animal welfare groups stems from concern that long periods of feed withdrawal cause an unacceptable stress on hens. While arguments can be made that hens voluntarily fast during incubation or that this stress is necessary to achieve cessation of lay, the fact remains that the general public does not accept these arguments. Some large egg buyers are demanding that the eggs they purchase must not be produced by hens that have been molted by feed withdrawal. A second factor that has affected the industry is research by Peter Holt, USDA-ARS, Southeast Poultry Research Laboratory, Athens, GA, that has demonstrated that hens without feed for several days are more susceptible to *Salmonella enteritidis* (SE) challenge. While most commercial flocks are not exposed to SE during the molting procedure it appears that a very small increased risk of SE infection does occur during the fast. This risk is offset by the known beneficial effects of molting. Post-molt improvements in shell and albumen quality contribute significantly toward safer eggs.

These developments have increased the interest of egg producers and applied poultry scientists in developing molting techniques that don't require feed withdrawal. To be completely successful these programs should induce a pause in egg production followed by a return to production with a profitable second cycle. They should result in improved egg quality and should not expose hens to a period of increased SE susceptibility. One such method was tested by Peter Holt. It involves feeding wheat

middlings free choice for 28 days and then returning the hens to a layer diet. In Dr. Holt's studies the hens were as resistant to SE challenge as controls kept on a layer diet, however, this was a small test and flock performance results could not be determined. Some California producers have been testing a method that involves feeding a limited amount of a low sodium, low protein diet containing mostly corn. This method has proven workable for some producers, but requires very careful feed distribution to assure that all hens receive a reasonable share of the feed. A method that did not require feeding a limited amount of feed each day would be preferred by most flock managers. The diet used should have a texture that would allow it to be fed with mechanical feeders. Such a method could be more easily and effectively applied under a variety of feeding situations. The following research reports from the recent meeting of the Poultry Science Association investigated some possible alternative molting programs.

A study conducted at the University of Illinois[1], compared a molting procedure of 4 or 10 days of feed withdrawal to full feeding of diets containing 95% wheat middlings or corn with added vitamins and minerals. These diets were fed for 28 days. Fasted groups were fed the corn diet for 24 or 18 days. All groups were returned to a 16% crude protein layer diet after 28 days. Both feed withdrawal methods and the wheat middlings diet resulted in complete cessation of lay within 8 days. Egg production of the group fed the corn diet had decreased to 3% by 28 days. Post-molt egg production (5 to 44 weeks after molt initiation) was reasonable for all treatments with the 10 day fast and the wheat middlings groups having the highest production. No consistent differences were found between treatments in mortality, egg weight or egg quality. The authors concluded that full feeding diets based on wheat middlings or corn are effective methods for molting hens. They noted that the wheat middlings were "fluffy" and would be difficult to feed through some feeding systems. These results appear to support the previous findings of Holt (wheat middlings diet) and California producers (corn based diet).

Research that involved molting with alfalfa was reported by Texas scientists working at Texas A&M University and the USDA-ARS, Food and Feed Safety Unit[2]. Hens were full fed alfalfa meal or hay (crushed cubed alfalfa) for 9 days or feed was withheld for 9 days. All groups stopped laying and then returned to egg production. The two alfalfa groups came back into lay earlier than the feed deprived group. Post-molt egg quality was comparable for all treatments.

In a second study[3] the alfalfa treatment was compared with a fasted group and a group continued on the laying diet. All hens were challenged with an oral dose of SE on the 4th day after feed changes. The total number of SE positive organs by group was alfalfa (10 positive of 60), fasted group (46 positive of 60) and non-molted control (0 positive of 60). The authors concluded that full feeding alfalfa may have potential as a molting method.

Readers should consider that these were preliminary studies with relatively small numbers of hens. Some of these feeds could not be easily fed through mechanical feeders unless they were pelleted. Additional studies are needed that can determine more clearly the usefulness of these methods.

References

1. Evaluation of non-feed removal versus feed removal methods for molting programs. P.E. Biggs, M.W. Douglas, K.W. Koelkbeck and C.M. Parsons. Poultry Science Supplement 1, p. 91, Abstract No. 375, 2001.

2. Egg production and quality response of commercial laying hens molted with alfalfa diets. K. Medvedev, C. Woodward, X. Li, L. Kubena, D. Nisbet and S. Ricke. Poultry Science Supplement 1, p. 54, Abstract No.224, 2001.

3. Use of an alfalfa diet for molting in Leghorn hens to reduce *Salmonella enteritidis* colonization and invasion. Y.M. Kwon, L.F. Kubena, C.L. Woodward, J.A. Byrd, R.W. Moore, D.J. Nisbet and S.C. Ricke.

Dr. Carol Cardona will review the research on SE and molting at the 2001 Poultry Symposium, November 6, Modesto and November 7, Riverside.

Ralph Ernst
Poultry Specialist
UC Davis

Managing Cage-Free Organic Hens

The following article is a synopsis of a speech given at the 2001 North Central Avian Disease Conference in October by Greg Herbruck with Herbruck's Poultry Ranch in Saranac, Michigan.

He begins his speech by saying "The egg industry is facing production issues that are potentially the greatest it has seen in its history." Over time, the industry has made significant advances in cage systems, housing environment, nutrition and disease prevention. These advances have always been made in the context of lower costs, greater efficiency and economies of scale.

Today we are seeing trends in the market that indicate increased demand for specialty branded eggs (some of which are organic) and customer dictated production methods. Both of these trends require a transition from least cost production methods to those that embrace consumer welfare guidelines. The organic egg market is no longer a small niche market. Today most large market chains offer one or more product lines of specialty eggs that span organic to free-range egg brands.

Among the most challenging specialty eggs to produce are the organic and free range eggs. Herbruck said that in preparation for producing these eggs he began by reading textbooks written in the 1950's. "I often comment that we are taking a giant leap backwards in how we approach husbandry practices with these hens." In spite of the challenges, Herbruck's Poultry Farm is committed to supply eggs to these markets.

"The greatest shock to me was the audit trail and documentation process. Essentially, we must be able to track a finished egg carton upstream in the process to the actual field of corn or soybeans involved with each dozen eggs. The amount of paperwork to accomplish this is daunting when you include 10 lay flocks and their pullet replacements. Our record keeping starts with receipt of certified organic feedstuffs. We assign a product code to each delivery from various farms that follows through the batching of rations. These feed rations are an accumulation of numerous codes as they enter the feed tank at the layer house, where they are date-stamped with a finished feed code. The eggs collected on a given day are tracked with this feed code for each layer unit. The eggs are then date and flock coded as they transfer to the processing plant. There they are given a typical Julian code date to track upstream in addition to the normal egg carton dating."

Herbruck said that organic eggs cost 2-3 times more to produce than typical commercial table eggs. He estimated his feed cost at $350/ton, his labor cost at 10 fold normal cage systems, but his building costs/bird are approximately equal to cage systems at $10 per hen.

Free-range systems result in lower housing densities that create challenges in maintaining house temperature. Overfeeding or underfeeding become more of a problem in these systems. Many times supplemental heating is required during the winter to maintain adequate house temperature. Also, during winter, reduced ventilation rates result in increased ammonia levels.

One of the major problems with organic production is disease management. "Mortality can run 2-3 times normal cage layer standards." Enteric diseases (bacterial, coccidiosis and worms) are often present because of litter picking. Under organic programs, producers are not allowed to treat or include chemicals in the feed that could prevent these diseases. The producer is often faced with the dilemma whether to live with the disease and poor bird health, or to suffer the economic consequences of removing the flock from the program in order to control the disease.

Herbruck says that marketing of organic eggs is similar to that of any new product. Time and money must be spent introducing and promoting the product. One unique challenge is that there is usually a very limited number of buyers for longs and shorts.

Douglas R. Kuney
Area Poultry Farm Advisor

Egg Income Update

Don Bell returned to the office after his bypass surgery in September to report that Southern California producers are experiencing a 4.9 cent per dozen average loss for 2001 through October 8th. This translates to about 80 cents per hen.

The Economics of Egg Washing

Eggs meant for human consumption are washed in the United States and commonly not washed in other countries. Washing has been shown to be the most practical and economic method of removing foreign materials and microbial contamination. Even though washing is not mandated by regulation in the U.S. (clean eggs are required by regulation), the procedure is regulated by regulation when used.

Egg grading laws in the U.S. state that consumer grades of eggs (AA and A) must be clean and clean is defined as:

"a shell that is free from foreign material and from stains or discolorations that are readily visible. An egg may be considered clean if it has only very small specks, stains, or cage marks, if such specks, stains, or cage marks are not of sufficient number or intensity to detract from the generally clean appearance of the egg."

Dirty eggs, on the other hand, are defined as:

"an individual egg that has an unbroken shell with adhering dirt or foreign material, prominent stains or moderate stains covering more than 1/32 of the shell surface if localized or 1/16 of the shell surface if scattered."

Eggs are cleaned to provide consumers with a more sanitary and aesthetically pleasing product. In the U.S., clean eggs are a requirement of the law and eggs which fail to meet these specifications are down-graded into a lower value category and are generally broken for liquid egg products and subsequently pasteurized. In the year 2000, the decrease in value for breaker eggs was estimated to be 35¢ per dozen. Obviously, it pays to produce clean eggs. In countries without strict clean egg regulations and egg price penalties for dirty eggs, there is less incentive to produce clean eggs.

Washing represents a relatively minor portion of the cost of processing and packing eggs for the shell egg market, but this cost is more than offset by the higher value received for the resulting cleaner eggs. Costs of washing include capital expenditures for equipment plus interest, electric energy to operate the equipment, labor to clean and maintain the equipment, cleaning and sanitizing compounds, water and water disposal costs. In addition, cracked and loss eggs may increase during the washing process. Income, though, will be higher as a result of fewer down-graded eggs.

The cost and income estimates listed in Table 1 and Table 2 are based upon a 400 case per hour in-line egg production complex operating 8 hours per day and 7 days per week. Equipment is depreciated in 5 years and a 8% interest rate is applied to the average investment (one-half the new value).

(continued on page 6)

Table 1. Estimated Costs Associated With Washing Eggs.

Item	$ Invested	$ Annual cost	Annual eggs (dozen)	Cents/doz.
Capital Expenditure	100,000	20,000	35,000,000	.0571
Egg washer with conveyors, Controls, Chemical dispensers, Dryers				
Interest on above		4,000		.0114
Miscellaneous Electric energy, Water and disposal Other		17,500		.0500
Labor cleaning and maint. (1 hr/day @ $10/hr)		3,650		.0104
Supplies * Cleaning and sanitizing compounds		87,500		.2500
Total		**132,650**		**.3790**

* Source: Chilson's Management Controls

Table 2. Income Estimates - Washed vs Non-washed eggs.

	Item	Income change
Washed Eggs	Base value of 35 million dozen eggs @ $.50/dozen	$17,500,000
	0.2% additional loss eggs (zero value)	-$70,000
	0.2% additional cracks (-35¢/dozen)	-$24,500
	Net income ($)	**$17,405,500 (49.7¢/dozen)**
Non-washed Eggs	Base value of 35 million dozen eggs @ $.50/dozen	$17,500,000
	10% more dirty eggs @ -35¢/dozen	-$1,225,000
	Net income ($)	**$16,275,000 (46.5¢/dozen)**
Net Difference		**+$1,130,500 (+3.200¢/dozen)**

Table 3. Net Costs - Washed Eggs.

Item	Annual Advantage	¢/dozen
Washing costs	-$132,650	-.379
Additional Income	+$1,130,500	+3.200
Net	**+$997,850**	**+2.850**

Note: This comparison does not include the costs of hand separation or cleaning of dirty eggs.

Prepared by Donald Bell, Poultry Specialist (Emeritus), September 8, 2001
University of California, Cooperative Extension, Riverside, California

Wilbor O. Wilson 1910 - 2001

Dr. Wilson came to the University of California, Davis, in 1946 as an Assistant Professor in the Department of Poultry Husbandry. He studied environmental physiology with emphasis on the effect of temperature and lighting on laying hens. Wilbor was one of the first to explore the use of evaporative cooling on poultry and evaporatively cooled laying houses began to appear in California as early as 1950. One of his early graduate students, Jack Hillerman, investigated the response of chickens to changes in temperature and demonstrated how hens acclimate during hot weather. Later Wilbor demonstrated the control of lighting programs on sexual maturity and maintenance of egg production. He was one of the first to demonstrate that constant day-length lighting programs are equivalent to step-up, day-length programs for laying hens. He also researched lighting programs for turkeys and game birds. He is credited with introduction of the Japanese Quail as a useful research bird for pilot studies. Dr. Wilson is survived by two sons, two daughters and eight grand children. Memorial donations can be sent to the International House, 10 College Park, Davis 95616 or Our Faith Lutheran Church, 1801 Oak Avenue, Davis 95616. Letters of condolence may be sent to the family at 718 Oak Avenue, Davis 95616.

Ralph A. Ernst
Extension Poultry Specialist
U.C. Davis

WPDC News

The Western Poultry Disease Conference elected Dr. Ken Takeshita, Lohmann Animal Health International, President of the 51st Conference. The 2002 conference will be held in Puerto Vallarta, Mexico at the CasaMagna Marriott Resort. Dr. Art Bickford, retired Assistant Director, California Animal Health and Food Safety Laboratory System and Mr. Donald Bell, retired Extension Poultry Specialist, were honored at the 50th meeting for outstanding service to the poultry industry.

2001 Calendar

***October 22**
California Egg Quality Assurance Program Agency/Industry Team Meeting, Sacramento Airport Host Hotel, 9 a.m. - Noon.

***November 6**
UC Poultry Symposium and Egg Processing Workshop, Stanislaus County Agricultural Center, 3800 Cornucopia Way, Suite A Conference Room, Modesto, 9:00 a.m. - 3:30 p.m. Registration $35 per person. See page 1 of this newsletter for registration information. **Pre-registration is required if you want lunch!**

***November 7**
UC Poultry Symposium and Egg Processing Workshop, Chan's Oriental Cuisine, 1445 University Avenue, Riverside. 9:00 a.m. - 3:30 p.m. Registration $35 per person. See page 1 of this newsletter for registration information. **Pre-registration is required if you want lunch!**

**Approved for CEQAP Credit*

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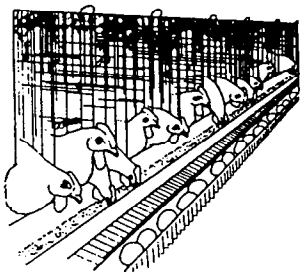

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