1971

Certain Factors Affecting Shell Egg Quality: Shell Conditions, Causes, and Suggested Corrective Measures

Cooperative Extension South Dakota State University

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FS 551

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Cooperative Extension Service
South Dakota State University
United States Department of Agriculture

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SHELL

Condition	Causes	Some Corrective Measures
Thin, sandy, rough, ridged, misshapen or soft. 	Arasan (Tetrame Thylthiuram Disulfide)	Do not include arasan treated grains in the diet of layers. Law requires a dye to be added to treated grain.
	Sulfanilamide (sulfa drugs)	Use according to accepted recommendations.
	High temperatures (constant)	Temperature control, provide plenty of water.
	Respiratory diseases (Newcastle, infectious bronchitis, and laryngotracheitis)	Follow a recommended program for vaccination and disease prevention in poultry.
	High salt (NaCl)	Feed less salt.
	Drugs for rodent control	Keep rat bait away from poultry.
	Age of hens	Replace after 12-14 months of lay.
	Frightening	Avoid sudden noises and approach birds with caution.
	Chemicals such as BAPN (Beta-Amino-Propionitrile Furmarate) and premature passage of egg through the oviduct	Do not feed this drug to layers.
	Reduced calcium intake	Provide 3% calcium during cool weather. Provide 4% calcium during warm weather. $\frac{\%\text{ rate of lay}}{\#\text{ feed/100 hens/day}} = \%$ calcium needed in feed.
	Heredity	Select strains that produce eggs of good shell quality.
Abnormal color: Brown to white	Nicarbazine	Do not feed to layers.
White to yellow	Chlortetracycline (600-800 ~~grams/ton~~), ~~Aureomycin~~	Use according to accepted recommendations.
	Gas leak in lines or burners	Maintain tight connections in gas line, keep burners in excellent working condition and provide ventilation in areas where gas is used as a source of heat in egg rooms.
White to brown	Iron ($FeSO_4 . 7H_2O$) 0.1 ppm	Have iron content checked in water used for washing eggs. Keep below 0.1 ppm.
Faded color	Low calcium in diets of turkeys	Raise calcium levels for increased shell color and improve shell thickness.
Mottling of shell (Bright spots or moist appearance around pores, observed by candling).	Water retained by protein in spongy layer of the shell	Do not mistake for a crack or cracks in the shell. Maintain high humidity (80%) in egg room.
Porosity	Age and breed of hens, environmental temperatures, and season of year	Keep hen house cool, hold eggs in cool place, sell hens after 12-14 months of lay, and select strain bred for good shell texture.
Tremulous or moving air cell (observed by candling).	Usually rough handling	Observe and make necessary alterations in egg handling practices.

WHITE (albumen)

Condition	Causes	Some Corrective Measures
Pink egg whites	Cotton seed meal	Avoid its use in the diet of layers.
Weak, thin, or watery whites.	Increased alkalinity, (pH)— Loss of CO_2	Use a shell coating such as oil or refrigerated temperatures (40-55°F).
	Respiratory diseases (Newcastle, infectious bronchitis, and laryngotracheitis)	Follow a recommended program for vaccination and disease prevention in poultry.
	Heredity	Select strains of known egg white (albumen) quality.
	Arasan	Do not use arasan treated grains in the diet of layers.
	Vanadium	Use sources of phosphorus in feeds known to have low amounts or none.
	Ammonia from droppings	Better ventilation, use superphosphate on litter and manure and remove droppings regularly from under cages.
	High environmental temperatures	Collect eggs often (3-5 times a day) and hold in refrigerated temperatures (40-55°F).
	Age of hens	Replace hens after 12-14 months of lay.
	Sulfanilamide (sulfa drugs)	Use according to accepted recommendations.
	Non-coated egg shells or non-covered egg cartons	Oiling and/or the use of plastic materials for the retention of moisture and CO_2
Green rot and other types of microbial spoilage	Microorganisms, including bacteria, molds and fungi	Maintain clean nesting materials. Gather eggs frequently (3-5 times a day). Use clean water for washing eggs. Maintain temperature of egg wash water (110 to 120°F) above that of the egg at all times. Use recommended amounts of detergents and sanitizers. Keep equipment clean. Use clean packing materials. Keep eggs refrigerated. Green rot is easily detected with an ultra violet lamp candler. Other types of advanced spoilage are easily detected with regular candling techniques. Egg wash water containing .4 ppm of iron can promote bacterial spoilage.
Cloudy white	Prompt oiling of newly laid shell eggs	Delay oiling for 1 to 6 hours after eggs are laid.
	Prompt refrigeration of newly laid shell eggs at low temperatures (32 to 39°F)	Maintain eggs under refrigeration temperatures of 40 to 55°F.
Yellow coloring in white	Hepzide	Do not feed to laying hens.
Flecks or spots in albumen	Partially cooked	Avoid excessive heat when washing eggs.
	Blood and meat spots	Select strains known for clear egg whites (albumen).
Off-odors and flavors	Chemicals for treating parasites Odorous flowers, fruits and vegetables in egg storage areas	Use chemicals recommended for the control of lice and mites. Do not use materials capable of imparting odors or flavors to eggs such as BHC or Lindane, Hexaphene. Do not store flowers, fruits and vegetables in the same area with eggs.
Blood and meat spots	Before and during ovulation there may be hemorrhaging	Tranquilizers, vitamins A and K, and aureomycin.
	Breed	Select strains with low incidence.
	Continuous and short intermittent periods of light	Use 14 hours of light.
	Color or pigment caused by prophyrin as found in the brown shell egg	Select strains with low incidence.

YOLK

Condition	Causes	Some Corrective Measures
Blood and meat spots	Hemorrhages (ovarian, may be inherited)	Select strains with low incidence.
Mottled or blemished yolks. 	Nicarbazine	Do not feed to layers.
	Cotton seed meal	Avoid its use in the diet of layers.
	Piperazine citrate	Do not use frequently or continuous.
	Movement of water from egg white across vitelline membrane into yolk material	Cool eggs quickly and keep cool. Use other accepted quality control practices.
Thick, pasty, rubbery, or cheese-like	Crude cotton seed oil (malvalic acid and sterculic acid)	Avoid its use in the diet of layers.
	Yolks laid internally	Remove offending birds from the flock.
	Freezing of intact egg (27°F or below)	Maintain shell eggs in temperature above freezing—40-55°F.
Color:		
Olive or salmon colored yolks	Five percent or more cotton seed meal.	Avoid its use in the diet of layers.
Platinum yolks (colorless yolks)	Possible infection (causative agent unknown)	Antibiotics. (200 grams aureomycin and 2 pounds NF-180 per ton of feed for 7 days).
Colorless yolks	Lack of Xanthophyll	Consideration should be given to the source of Xanthophyll such as yellow corn meal, alfalfa leaf meal, etc.
Green	100 to 250 mg. of sodium chlorophyllin in feed	Avoid feeding to hens.
	Seed pods of Shepherd's purse and pennycress	Use clean grains in feeding programs.
Greenish-brown	5 grams or more of Pimiento peppers daily to each hen	Use smaller amounts for a desirable color in egg yolks.
Orange-pink	Red pepper	Avoid feeding to hens.
Yellow to orange	Seaweed meal (algea), dehydrated alfalfa meal, corn gluten meal, flower petal meal, dried chili peppers, powdered African red peppers, dried sweet potatoes, dried carrots, corn oil products, food grade fat soluble dyes, etc.	Feed recommended levels of Xanthophyll bearing materials for desired egg yolk color. Yellow =13 milligrams of Xanthophyll per pound of feed. Medium orange=23 milligrams of Xanthopyhll per pound of feed. Orange =34 milligrams of Xanthophyll per pound of feed. Maximum color will be present 10 days after the hens are placed on feeds for yolk color.
Apparent misplaced egg yolk (observed in the whole egg by candling).	Unknown	The egg positioned with the small end down may aid in correcting this situation.
Misplaced egg yolk	Large end up with yolk in large end—thin egg white and/or fat content of yolk. Large end up with yolk in small end—thin egg white and/or water content of yolk.	Use accepted quality control practices such as gathering, cooling eggs and storing in a cooled atmosphere.
Off-odors and flavors	Chemicals for treating parasites. Odorous fruits and vegetables in egg storage area	Use chemicals recommended for the control of lice and mites. Do not use materials capable of imparting odors or flavors to eggs such as BHC or Lindane, Hexaphene. Do not store flowers, fruits and vegetables in areas with eggs.
	Chemicals or egg washing compounds	Do not place egg washing powders or liquids directly on eggs.
Flat	Weak vitelline membrane	Gather eggs often (3-5 times a day). Cool temperatures (40-55°F). Hold under refrigeration. Market often.

Egg quality is affected by many factors that can be controlled at the farm level. A summary of these factors has been compiled in chart form for easy reference. Methods of correcting these problems have been suggested. As more emphasis is placed on egg quality it is important that all possible defects be eliminated. When defects are found, consult the chart for possible causes and corrective measures.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Dr. Duane Acker, Acting Director of Extension, South Dakota State University, Brookings.
2M—10-71—File: 4.8-4—2703

COOPERATIVE EXTENSION SERVICE
U. S. DEPARTMENT OF AGRICULTURE
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2M—10-71—2703

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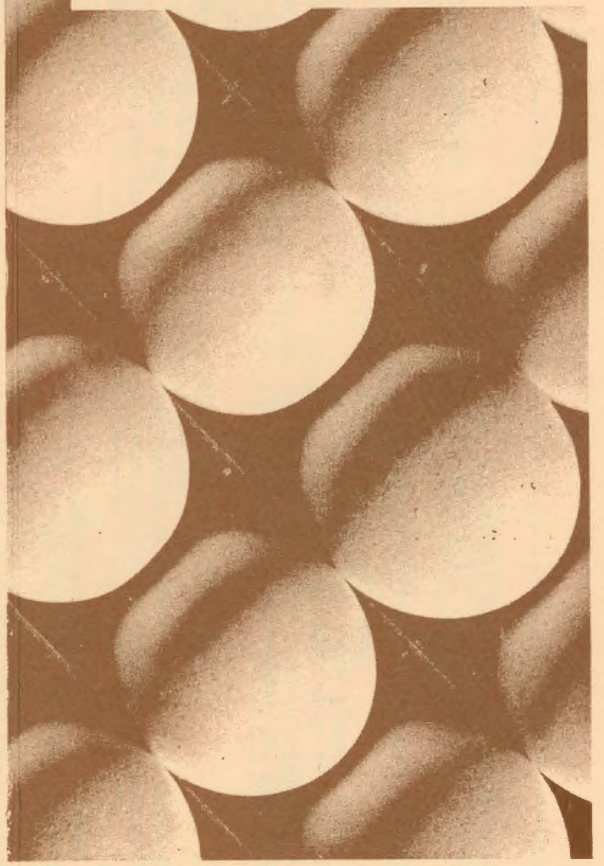

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