INCLUSION RATE OF BLOOD AND MEAT SPOTS OF ALL SIZES IN WHITE AND BROWN EGG LAYERS PRE AND POST-MOLT

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INTRODUCTION

Blood and meat spots in eggs for consumption are unfavorable to consumers (Nalbandov and Card, 1943). The USDA has specifications and allowances for blood and meat spots which would provide for the removal of eggs with these defects from entering the market chain (USDA-AMS, 2000). Most blood and meat spots can be detected with candling and are graded against (Solomon, 2002).

Blood spots in eggs are caused at ovulation, when blood vessels that cross the stigma line rupture as the follicle releases the ova. Blood spots are confined to the yolk mass. Meat spots are generally recognized as tissue rich deposits, the result of oviduct breakdown, or calcium rich fragments, and are confined to the albumen (Solomon, 2002). Meat spots may also be degenerated blood spots (Nalbandov and Card, 1943).

Campo and García Gil (1998) found that possible causes of blood spots in eggs include stressful and frightening conditions. Blood spots also have a genetic component as some hens are more subject to the production of blood and meat spots than others. This is most noted in the differences between white and brown egg strains (Campo and García Gil, 1998). It may be that the primary difference in inclusions of brown and white shell eggs is the presence of pigment in the inclusions from brown shell eggs, causing these inclusions to be more easily seen (Bayer et al, 1974). A deficiency in Vitamin A can cause an increase in the incidence of blood spots (Bearse *et al.*, 1959).

MATERIALS AND METHODS

Seven white-egg layer strains and three brown-egg layer strains were randomly arranged between three treatments: non-molted (NM) which were maintained in continuous production, feed restricted (FR) which were molted using feed restriction at

463d of age for 14d, and nonfasted (NF) which were molted using a nonfasted/anorexic program of ad libitum supply of low protein, low energy feed. Eggs were collected during the first cycle phase, the molt phase and the second cycle phase of lay and taken to North Carolina State University for examination. Eggs were opened and blood and/or meat spots were recorded. Should say something about statistics here

RESULTS AND DISCUSSION

During the first cycle phase of lay, there were no significant differences in blood spots between white eggs and brown eggs. Brown eggs demonstrated a significantly higher percentage of meat spots than white eggs, consistent with data from Campo and García Gil (1998).

During the molt phase, brown eggs contained a significantly greater percentage of blood spots and meat spots than white eggs. Also, eggs from NM hens contained a significantly greater percentage of blood spots and meat spots than those from FR hens, while NF was intermediate. There was a significant interaction in meat spots in the molt phase, with brown eggs from the NM treatment containing a significantly greater percentage of meat spots than brown eggs from NF and FR, which were significantly greater than white eggs from the three treatments. Nutrition obviously influences the incidence of meat spots; the non-molted brown egg laying hens may have experienced more oviductal tissue breakdown due to continuous production causing more meat spots, while the brown egg laying hens in FR and NF went out of production, causing their oviductal tissue to renew itself when the hen was not laying as many eggs. The molted hens still produced eggs during this phase? Those with greater nutrition had more meat spots...meaning better tissue that was able to regenerate itself?

In the second cycle phase of lay, brown eggs demonstrated a significantly greater percentage of blood spots and meat spots than white eggs. Eggs from the NM treatment also demonstrated a significantly greater percentage of blood and meat spots over FR and NF treatments. An interaction was noted in blood spots with brown eggs from the NM treatment containing a significantly higher percentage than brown eggs from NF and FR; white eggs from FR contained the least, and white eggs from NM were intermediate to brown NF and FR and white NF and FR. An interaction was noted in meat spots as well, with brown eggs from NM containing significantly more than those from NR or FR, which contained significantly more than white eggs from all three treatments.

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Table 1. Comparison of egg inclusions in white and brown egg strains and the effect of molt

	1st Cycle Phase		Molt Phase		2nd Cycle Phase	
Source	Blood Spots	Meat Spots	Blood Spots	Meat Spots	Blood Spots	Meat Spots
	(%)	(%)	(%)	(%)	(%)	(%)
White Eggs	2.2 ±0.7	7.7 ±1.5^{B}	1.5 ±0.6^{b}	6.8 ±1.1^{B}	1.9 ±0.3^{B}	2.9 ±0.3^{B}
Brown Eggs	3.2 ±1.2	25.0 ±2.6^{A}	4.6 ±1.0^{a}	22.7 ±2.0^{A}	4.2 ±0.5^{A}	10.6 ±0.6^{A}
Molt						
NM			5.3 ±1.0^{a}	19.2 ±2.0^{A}	4.7 ±0.5^{A}	8.4 ±0.6^{A}
FR			1.4 ±1.0^{b}	10.4 ±2.0^{B}	2.0 ±0.5^{B}	5.9 ±0.6^{B}
NF			2.5 ±1.0^{ab}	14.6 ±2.0^{AB}	2.5 ±0.5^{B}	6.0 ±0.6^{B}
Interaction						
Egg x Molt			NS	0.02	0.02	0.04

^{abc}(P<0.05)
^{ABC}(P<0.0001)