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**SERUM CALCIUM LEVELS OF THE RED-WINGED BLACKBIRD**  
(*A GELAIUS PHOENICEUS*)

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Abstract

Serum calcium levels were analyzed by atomic absorption spectrophotometry during different stages of development of the Red-winged Blackbird (*Agelaius phoeniceus*). The effects of the reproductive cycle, growth, and soil calcium on mean serum calcium levels in this species were analyzed as were the effects of mean serum calcium levels on eggshell thickness, hatchability, and egg production.

Females sampled from a decoy trap on consecutive days approaching the nesting season did not show a significant change in mean serum calcium levels. However, birds sampled from the field during the process of eggshell calcification had an average serum calcium level of 31.84 mg% with a range of 14.85 to 61.73 mg%. Serum calcium levels fell rapidly during the second day of incubation of a full clutch of eggs and reached non-reproductive levels sometime during the sixth or seventh day of incubation. Normal, non-reproductive levels in female birds averaged 9.00 mg% with a range of 7.02 to 10.66 mg%. The mean serum calcium level of all brooding females was 11.39 mg%.

Eggshell thickness, hatchability of fertile eggs, and the "reproductive potential" were not significantly correlated with serum calcium levels of ovulating females. However, there was a significant difference in mean serum calcium levels with relation to egg production. Birds with an egg production potential (determined by ovarian and oviduct examination) of three had a mean serum calcium value of 27.07 mg% and those with a potential of four had a mean value of 37.13 mg%. The correlation coefficient ( $r = 0.533$ ) observed between eggshell thickness and hatchability was significant at the 1 percent level.

An epaulet coloration scheme was devised to group arbitrarily female birds into 9 categories. Serum calcium and fertility were negatively correlated with more intense epaulet coloration patterns. A significant correlation coefficient ( $r = 0.245$ ) was observed for eggshell thickness as related to increasing epaulet coloration. Hatchability of fertile eggs and egg production were not significantly correlated with the epaulet coloration categories.

There were significant differences in mean values for shell thickness of eggs collected from fields with varying amounts of soil calcium. However, the correlation values for serum calcium, eggshell thickness, and hatchability of fertile eggs as related to increasing total amounts of soil calcium were non-significant.

Serum calcium levels of cage-acclimated females during the months of May and June declined significantly with increasing periods of confinement. Hormones

during periods of stress are discussed and related to the problem of decreasing serum calcium levels.

The age of the bird had some effect on the amount of serum calcium present in the blood. It was found that nestlings had the lowest levels (6.62 mg%) followed by juvenile birds (6.63 mg%). Fledglings had the highest recorded levels (9.58 mg%), and subadults and adults had levels of 8.55 and 8.81 mg%, respectively. There was no statistical evidence indicating a difference in serum calcium levels between the sexes within the various age groups.

This investigation provided some evidence that thyroxin, which is known to be involved in the molting process, may have a depressing action on serum calcium levels. There was a detectible difference in serum calcium levels between molting and non-molting adult Red-wings. The difference was negligible in juvenile birds.