

CHICK MORTALITY ASSOCIATED WITH ELEVATED WATER LINES AND CONSUMPTION OF WET LITTER¹

S. L. BRANTON,² J. D. SIMMONS, B. D. LOTT, and D. M. MILES

USDA, ARS, South Central Poultry Research Laboratory,

Mississippi State, MS 39762-5367

Phone: (662) 320-7479

FAX: (662) 320-7589

e-mail: sbranton@ra.msstate.edu

W. R. MASLIN

College of Veterinary Medicine, Mississippi State University

Mississippi State, MS 39762-9825

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SUMMARY

In a nipple waterer study, 55 (6.11%) of 900 total chicks were found dead the day after placement with another 25 to 30 chicks alive but in apparent respiratory distress. Examination of temperature and humidity records revealed no aberrations from the respective set points; however, examination of the dead chicks showed most to have a mass of litter (pine wood shavings) in the mouth cavity. The litter mass appeared to be wet and to physically block the opening of the larynx. Reexamination of the house showed the water line to be 3.5 cm higher than the factory recommended level. Furthermore, several nipples had leaked, which resulted in wet litter. We concluded that in their attempt to satisfy thirst, the smaller chicks consumed the wet litter beneath the leaking nipples and succumbed to choking.

Key words: Chicks, mortality, water height, wet litter

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DESCRIPTION OF PROBLEM

In recent years, nipple waterers have become the standard broiler watering system. The shift by the poultry industry from open-type waterers to nipple waterers has been rather dramatic and, in large measure, has been promoted through innovations in water filtration as well as the development of effective low-pressure nipples. The change to nipples has brought cleaner drinking water and reduced labor necessary to main-

tain waterer cleanliness with the overall result of improved sanitation, reduced spillage around the waterers, and less condemnation at the processing plant.

The height of nipple waterers has been shown to contribute to different consumption (usage) patterns when broilers are exposed to high cyclic temperatures [1]. Large broilers (four pounds and greater) have difficulty drinking from nipples in hot weather when they are panting [1], in effect restricting water consumption.

¹ Trade names in this article are used solely to provide specific information. Use of trade names does not constitute a guarantee or warranty by USDA and does not signify that the product is approved to the exclusion of other comparable products.

² To whom correspondence should be addressed.

With water consumption restricted, feed consumption decreases and results in diminished growth and feed utilization. Lowering the height of nipple waterers has been shown to result in faster growth and improved feed utilization in male broilers [2].

In an experiment with nipple watering systems, mortality was noted in chicks the day after placement. This paper describes an event in which the mortality of 2-d-old chicks was attributable to choking with asphyxiation or to a combination of water deprivation and choking with asphyxiation in association with the ingestion of wet litter. The litter was wet as a result of highly placed, leaking nipple waterers.

MATERIALS AND METHODS

Nine hundred commercial broiler chicks of a single genetic strain were placed, at 1 d of age, in a research facility. The placement area consisted of a 11-x-6.1-m section of a conventional-type chicken house that was heated to 32 C with natural gas-fired brooders. Replicating poultry industry practice, floor bedding consisted of pine shavings that had been used in rearing a previous flock after which the "cake" had been removed and top-dressed with fresh, kiln-dried, pine shavings. Nineteen hanging circular tube feeders, having a combined available feeder space of 1,952 linear cm, were uniformly distributed throughout the house to provide a starter diet for consumption ad libitum. Waterers consisted of one line of nipple waterers containing a total of 51 nipples. The waterer line was inadvertently set 3.5 cm higher above the level of the litter than was specified by the manufacturer instructions. Also, the waterer line was placed in the house such that some chicks could be as far as 4.6 m from the line in contrast to 2.4 m as suggested by the manufacturer.

The following day, approximately 21 h after placement, 55 chicks (6.11% of total) were found dead with another 25 to 30 chicks sternally recumbent, neck extended, and gasping. Although no weight measurements were taken, the moribund and dead chicks appeared to be small. The distribution of dead chicks seemed fairly uniform over the growing area. Five dead chicks were collected for necropsy and submitted to the College of Veterinary Medicine at Mississippi

State University. Examination of the house temperature and humidity recordings revealed no significant aberrations from the respective set points.

RESULTS AND DISCUSSION

Upon examination, all chickens appeared well fleshed but dehydrated. The oral cavity of each of the chicks was found to contain litter material. Incision of the buccal cavity, and extending along the beak, revealed accumulated litter material in the buccal and pharyngeal cavities, completely occluding the opening of the larynx (aditis laryngis) of the chicks (Figure 1). In three of the five chicks examined, litter material completely distended the esophagus to the esophageal-proventricular juncture (junctura esophagoproventricularis). Gross examination of the viscera and musculature of the chicks revealed no abnormalities.

Sections of heart, kidney, lung, esophagus, liver, and multiple sections of the oral cavity were placed in 10% buffered formalin for histological examination. Microscopic examination of the kidney, heart, and liver revealed changes characteristic of autolysis. Histosection of lungs appeared normal except in one case, which exhibited edema. All histosections of esophagus and histosections of oral cavity from four of the five chicks appeared normal or had changes attributable to autolysis. Areas of ulceration associated with heavy heterophilic infiltrates and large numbers of bacteria were observed multifocally in the remaining histosection of oral cavity (Figure 2). It was judged that the microscopic changes were associated with dehydration and ingestion of litter and that these changes seemed to be most evident in the oral cavity. A diagnosis of acute multifocal necrotizing stomatitis with intralesional bacteria was rendered.

Upon completion of the necropsy of the five chicks, a reexamination of the house, revealed leakage by several nipples such that the litter beneath those nipples was wet in areas of 5 to 12 cm diameter. Several of these areas were craterous, and we surmised that the shorter chicks, unable to activate the nipple waterers, had consumed the wet litter beneath the leaking nipples when attempting to satiate their thirst. Because chicks were unable to remove the litter



FIGURE 1. One-d-old chick. Large quantities of wood shavings are present in the oral cavity, pharynx, and proximal aspect of the esophagus.

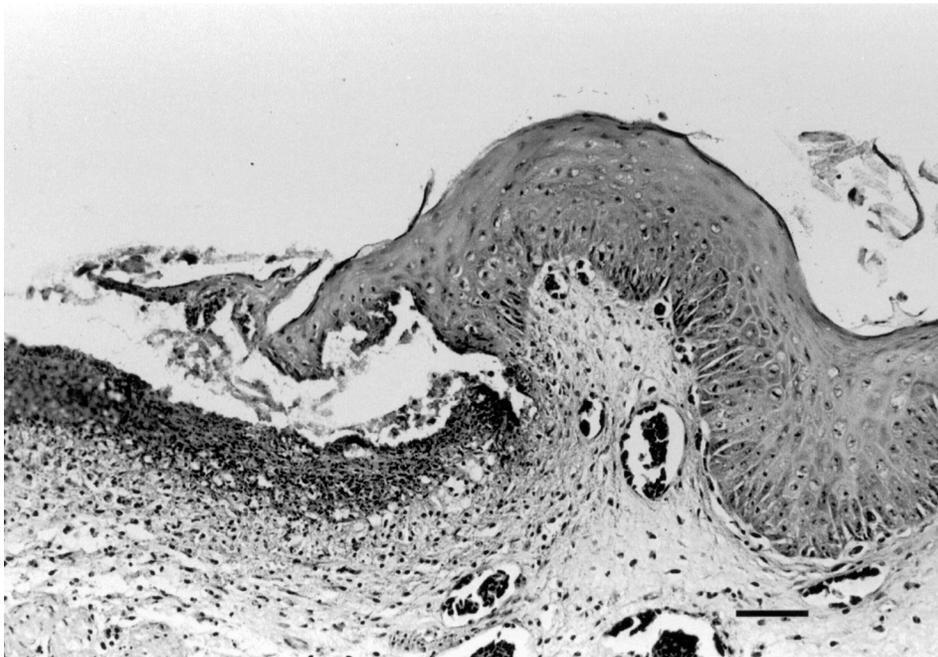


FIGURE 2. Photomicrograph of oral mucosal ulcer in a 1-d-old chick that was found dead with large quantities of wood shavings packed in its oral cavity. There is a complete loss of stratified squamous epithelium on the left side of the photo, accompanied by superficial necrosis and mixed, predominately heterophilic, inflammatory cell infiltration of the exposed submucosal stroma. Fragments of surviving epithelium partially overlie the ulcer. Bar = 50 microns.

or to swallow it, the litter aggregated, causing an obstruction of the opening of the larynx (aditis laryngis), thereby resulting in choking of the bird.

In conversations with producers, we learned that this problem has been observed in the field and that presence or absence of its occurrence is predicated on how correctly the grower sets the nipple water line relative to chick height. In the incident cited, 51 nipples were available for the chicks, a figure greater by 21 nipples than was recommended by the manufacturer.

However, the water line was located such that some chicks could be as much as 4.6 m distant, which contrasted with the manufacturer recommendation of a maximum of 2.4 m for a chick to be located from the water line. Additionally, the water line was set 3.5 cm higher than the 14.3 cm that was recommended by the manufacturer. The combination of these factors resulted in the scenario described in this paper. Further research has shown that for optimal chick activation, waterer lines having nipple waterers should be set such that the bottom aspect of the nipple is at eye level of the standing chick [2].

CONCLUSIONS AND APPLICATIONS

1. Waterer lines should be parallel to the floor of the house.
2. Height of water lines containing nipple watering devices should be set for the smallest (shortest) chicks.
3. Chicks unable to activate nipple waterers will consume wet material in their efforts to satisfy thirst.

REFERENCES AND NOTES

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