

The effect of water delivery on beak treated layer chicks

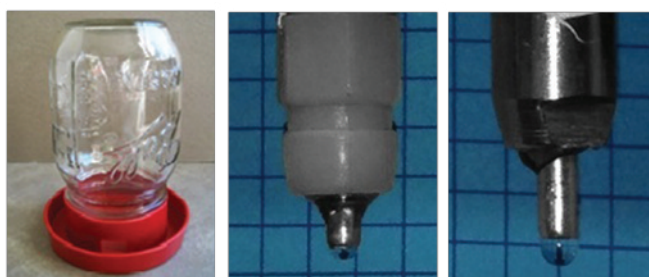


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The objective of the poultry layer industry is to produce healthy birds that can reach their maximum genetic potential for egg production. To achieve this, during pullet rearing, early mortality must be minimised, body weights must be maximised and flocks should have a high level of uniformity. This is accomplished by creating an environment that best caters to the unique needs of the growing chick, by offering convenient access to food and water, and ensuring facilities are properly heated, lit and ventilated.

Even though optimised, some elements, such as social behaviour, have proven to be difficult to control effectively. Certain conditions may introduce opportunities for increased levels of stress, which may ultimately lead to unwanted behaviours such as feather and vent pecking, as well as cannibalism.

Different approaches have been investigated to eliminate these behaviours such as modification of



Water presentation/delivery methods used in the case studies. From left to right: supplemental glass fountain jar, vertical pin nipple, 360-degree nipple.

environmental conditions, cage and housing variations, genetic selection and beak shape alterations.

Altering beak shape (blunting the sharp tip) has proven to be an effective means of minimising the risk of pecking related injuries and remains a popular choice for many operations.

Beak modification

Two different processes are generally employed. Hot blade trimming is typically performed on the farm within the first 10 days of hatch. A

mechanical device with a hot blade removes a portion of the beak, while cauterising the area where the tissue was removed.

Nova-Tech Engineering introduced Infrared Beak Treatment (IRBT) as a process to improve the welfare of domestic poultry, by substituting the physical cutting process of the beak with a non-contact process. This process is blood free and automated allowing a highly accurate and consistent treatment.

Infrared beak treatment is performed at the hatchery, at day-of-age. The tip of the beak is exposed to an infrared energy source which

penetrates the corneum inhibiting further growth of the underlying tissues. In approximately 10 days, the treated portion of the beak sloughs off with normal use.

Industry feedback suggests that under certain situations, beak treatment at day-of-age may cause increases in early mortalities. In this research, we have investigated if water availability and system configuration have an effect on beak treated layer chicks in the areas of chick mortality, body weight and flock uniformity.

Variations between vertical pin nipple drinkers and 360-degree nipple drinkers were evaluated, as well as the benefit of using supplemental drinkers during the first few days of rearing.

Case studies

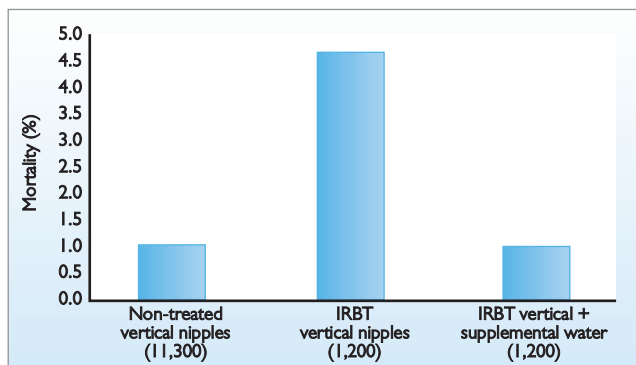
In each case study layer chicks were either untreated, infrared beak treated (IRBT) at the hatchery, or farm trimmed (FT) between seven and 10 days of age by hot-blade.

Case studies were carried out in cages with vertical nipples, 360-

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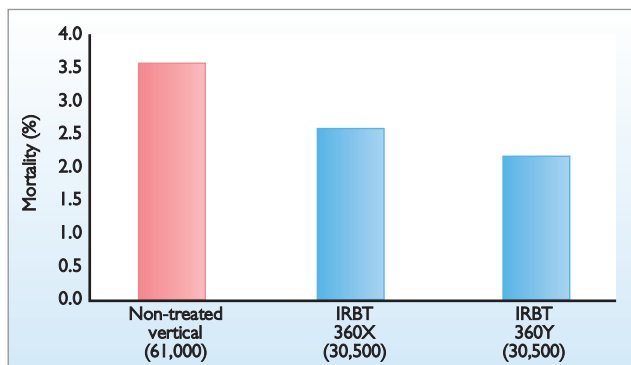
The importance of water

Three test groups were used: untreated chicks, IRBT chicks provided with vertical nipples, and IRBT chicks provided with vertical nipples and supplemental drinkers. Mortality was determined at 10 days. Mortality of the IRBT group provided with vertical nipples was elevated above the untreated group. The addition of supplemental drinkers decreased mortality to a level equal to the untreated group.



Are all 360-degree nipples created equal?

Three test groups were used: All groups were untreated and provided with either vertical nipples or with one of two different brands of 360-degree nipples. Mortality was determined at day 14. Both groups provided with 360-degree nipples (Brand X and Y) showed a reduction in early mortality. This is possible evidence that a switch from vertical nipples to 360-degree nipples may benefit non-beak treated chicks as well.



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degree nipples, or a 50/50 combination of both. Some case studies used additional supplemental fountain jar drinkers.

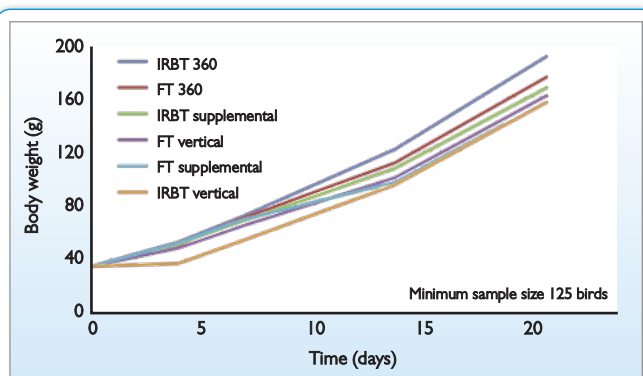
Throughout these trials, cage locations were randomised, and the quantity of test and control samples were carefully considered to ensure the most objective, and statistically significant test data.

The size of each group or sample is indicated on each figure in parenthesis.

Summary

Improvements in areas of mortality, weight gain, and flock uniformities were achieved when IRBT birds were given access to 360-degree nipples drinkers as opposed to vertical pin nipple drinkers.

Upon initial examination, mechanical differences between the 360-degree and vertical pin system appear minor; however, closer inspection reveals that vertical pin nipples require a precise up-and-



Supplemental water or 360-degree nipples?

Six test groups were used: IRBT chicks and FT chicks were each provided with vertical nipples, 360-degree nipples or vertical nipples plus supplemental drinkers. Mortality was determined at seven days and body weights were taken for 11 weeks.

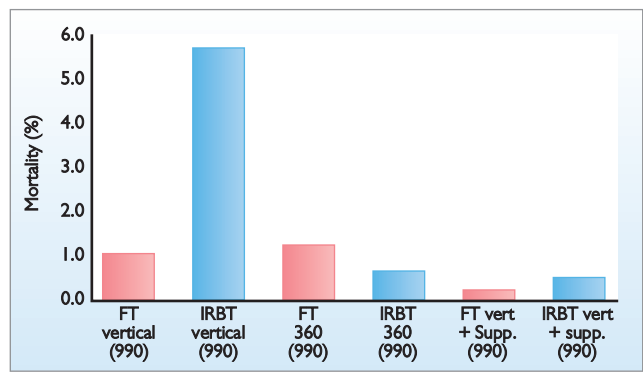
The addition of the supplemental drinkers decreased the mortality of the IRBT group. The IRBT group provided with 360-degree nipples had similar decreased mortality. This reduction in mortality was significant and equal or lower than the untreated group (FT chicks were not yet trimmed). A reduction in mortality was also seen in the untreated group when provided with supplemental drinkers.

The IRBT group provided with supplemental drinkers had improved body weights compared to the vertical nipple group, but the IRBT group provided with the 360-degree nipples had the greatest body weights for the entire 11 weeks of the study.

FT birds experienced a weight setback following the beak trim procedure regardless of the water system used.

IRBT treated birds provided with 360-degree nipples had a statistically significant weight gain advantage (8%) over the FT at three weeks of age. At 11 weeks, all groups provided with 360-degree nipples, regardless of beak treatment type, had higher body weights than all other water presentation/delivery methods and the body weights of the IRBT group remained higher than the FT group. (Data not shown.)

The IRBT group provided with 360-degree nipples had the highest weight uniformities during early and later stages of the pullet rearing (80% at three weeks and 93.1% at 11 weeks). Collectively, these results suggest that IRBT chicks, when raised on appropriately configured water delivery systems, can outperform hot blade-trimmed chicks in the areas of livability, weight gain and uniformity.



down actuation to produce a droplet of water. Additionally, once triggered, vertical pin droplet size tends to be substantially smaller than the 360-degree nipple.

Effective vertical nipple operation demands an advanced reliance on the beak's tactile abilities. Although

IRBT does not impair beak sensory input beyond the treat zone, IRBT may result in an absence of sensory response within the treatment zone, beak tip, until it sloughs off around day 11.

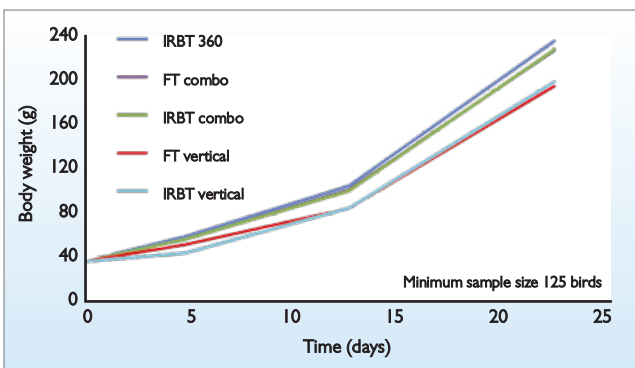
During the first few days after treatment, effective manipulation of

the vertical pin nipple may, therefore, be more challenging. This can be compared to the sensation one experiences after a visit to the dentist following an injection of novocaine – certain temporary decreases in tactile capabilities tend to be common.

In comparison, actuation of the 360-degree nipple is simple. Movement in any direction (hence the name), results in the release of a droplet. Droplet size is significantly larger than what the vertical pin nipple produces, resulting in the need for fewer actuations to produce a given volume of water.

The format of water delivery seems to be more critical for IRBT chicks. We have shown here that in each case study, IRBT chicks provided with water from 360-degree nipples showed significant improvements over chicks provided with vertical pin nipple drinkers. The results show the IRBT chicks have reduced mortality, improved body weights and higher uniformity, outperforming the FT chicks when provided with 360-degree nipples. ■

References are available from the author upon request

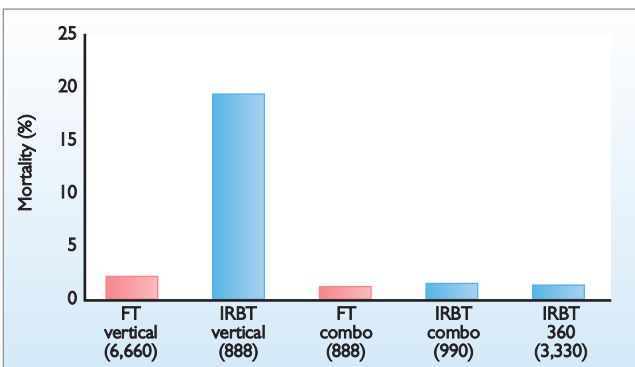


Vertical, 360-degree or a combination?

Five test groups were used: IRBT chicks and FT chicks were provided with all vertical nipples, all 360-degree nipples or a 50/50 combination of vertical and 360-degree nipples (Combo). Mortalities were collected through day 10 and body weights were taken for three weeks.

Both FT and IRBT groups provided with Combo drinkers showed a decrease in mortality as compared to groups provided with vertical nipples. The IRBT group provided with 360-degree nipples showed a slight additional decrease in mortality as compared to Combo drinkers.

Body weights of both the IRBT group and FT group provided with a Combo or 360-degree nipples were greater than those provided with vertical nipples. Increased weights for the 360-degree and Combo nipples continued to be distinct on day 13 and 23.



Can 360-degree drinkers still use help?

Six different IRBT flocks were each divided into two different test groups. These flocks were from two different hatcheries with flock ages ranging from 44-64 weeks. All test groups were provided with 360-degree nipples and half of the groups were also given supplemental drinkers. Mortality was determined at day 14 and body weights were taken at seven and 14 days. Mortality was reduced for five of the six flocks when supplemental drinkers were added to the 360-degree nipples. This indicates that although 360-degree nipples reduce mortality, chicks raised on 360-degree nipples may benefit from having access to an open water drinker early on.

Over these six separate flocks, in each group where supplemental drinkers were provided, the body weights were greater at seven and 14 days, although not always statistically significant. The flock weight uniformity was also higher among the groups provided with supplemental drinkers (data not shown). The 360-degree nipples showed improvements over the vertical nipples in the previous case studies, but here, additional benefit was seen with the addition of supplemental drinkers when paired with 360-degree nipples.

