

# Measure flow rates and avoid cuts in weight gain

**Low water flow rates cut weight gain. Assuming that birds are receiving sufficient water via the nipples not good enough. You have to make sure by measuring the flow rate and adjusting it to the right level.**

By B Lott, PhD, *Extension Professor with Mississippi State University* and WA Dozier, III, PhD, *Extension Poultry Scientist with the University of Georgia, USA.*

**N**ipple drinkers are an often forgotten entity in most poultry houses. The grower sees water droplets from the nipples and/or water in the cups and assumes birds have enough to drink. We've long assumed that if the flow rate happens to be low, birds can spend more time at drinkers to drink their fill. Research last year disputed that assumption. Field observations in commercial houses in the USA (Mississippi and Georgia) have shown that low flow rates can reduce weight gain in broilers.

## Easy-to-use formula

We have long known how much birds need to consume but hadn't translated that into a minimum flow rate until a representative of a nipple manufacturer started asking questions. They also did preliminary research that has been replicated at the USDA Poultry Laboratory in Mississippi, to support the following formula: Multiply 7 millilitres per minute (mL/min) times age in weeks, and add 20. For example, a 5-week old bird needs about 55 mL/min ( $7 \times 5 = 35 + 20 = 55$ ). Growers can use this to quickly calculate the flow rate a flock needs.

In the field, it is not uncommon for

90% of the older houses in the Southeast of the USA to have low flow rates, often as low as 15 mL/min and in some cases zero. This is less frequently a problem in newer houses. This is important to growers because of the strong relationship between water flow, feed consumption and weight gain. Overall, birds drink 1.55 to 1.75 grams of water for every gram of feed they consume. A bird that drinks less eats less and gains less weight.

In the past, measuring nipple flow rates was an untidy task. You had to kneel in the litter and hold a measuring device under the nipple. Now we have developed the water flow rate stick, now being manufactured by Val-Co (*Photo 1*). When the grower uses this yard-long device to trigger a nipple, water flows into a graduated cylinder where it can be measured at a glance and poured out before measuring the next one (*Photo 2*).

## Flow rates at sloped floors

Some older houses are built on a slope. A typical older house might have a 30-cm slope, or a 15-cm drop from one end to the centre (*Figure 1*). With this type of slope one may not use slope regulators. At the centre of the house, the water in the standpipe may be 23cm; at

the other end it's 7.5cm due to the slope. The flow rates at the ends of this house will be different from those in the centre, and that's when you are asking for trouble – more than just the reduced weights.

Here's why. Assume in our schematic (*Figure 1*), that 40 mL/min is an ideal flow rate and 20 mL/min is a reduced flow rate. In this type of house, the control feed pans are located at the 20 mL end of the house. The birds in this location will have the lowest



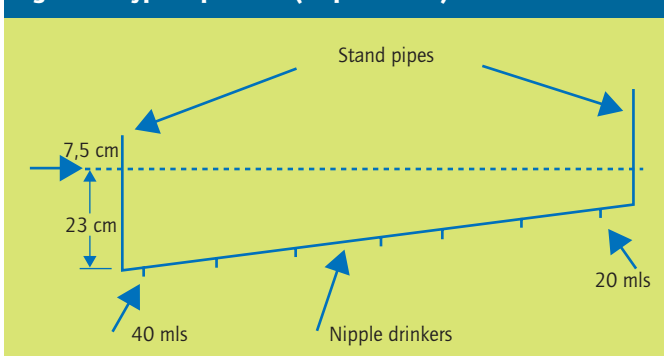
**Val-Co Southeast representative Russell Perry measures the nipple flow rates with the Val-Lott stick.**

feed consumption by virtue of reduced water intake. Birds at the 40 mL/min end of the house are going to be hungry by the time their pans are refilled. Not only does this reduce overall weight gain, it causes a meal-feeding situation that results in gorging of the crop. In addition, hungry birds exhibit excessive activity causing scratches and skin tears leading to an increased incidence of infectious process (IP) and gangrenous dermatitis causing carcass condemnations. In a worst-case house with a 180-cm slope and a maximum flow rate of 30 mL/min, the average weight of birds sold on this farm was 1,450g. This compares to a weekly complex average of 1,770g. Although low flow rates may not have caused the total shortfall, it's a likely suspect because we know that reduced water intake reduces feed intake, which results in reduced weights.

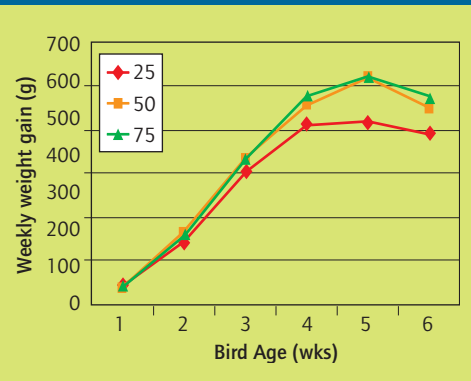
## Low flow rates limits weight gain

Research in 2002 conducted at USDA-ARS clearly demonstrated the effects of reduced flow rate on body weight gains. After about 4 weeks at a flow rate of 25 mL/min with 10 birds per nipple, body weight starts to decrease compared to birds receiving 50 mL/min with significant reduction occurring in body weight in the 5<sup>th</sup> and 6<sup>th</sup> weeks.

**Figure 1 - Typical problem (sloped house)**



**Figure 2 - Effects of nipple flow rate on weekly body weight gain grams) based on RS research data at 27°C (80°F) with 10 birds per nipple**



When the temperature was increased from 21 °C to 27 °C, the reduced body weight began to become apparent at 3 weeks of age (*Table 1*). At 6 weeks of age, even birds receiving 50 mL/min had lower body weight than those birds receiving 75 mL/min. It is obvious in light of our rule of thumb that a 6-week old bird needs 42+20 mL/min.

Does this hold true for birds of all sizes? At a farm raising big birds, two houses



**Water enters the yellow valve, fills the calibrated cup, and can be poured out the t-fitting.**

with average nipple flow rates of in excess of 125 mL/min produced birds weighing 3,745g. In another house on the same farm with a flow rate of 44 mL/min, birds averaged 3,475g.

On a His and Hers farm producing small birds, his houses had flows of 90 mL/min, hers had 30 mL/min. Her houses had never had the superior performance. After doubling the height of the balls in her standpipes, Her next flock out-per-

formed His for the first time ever.

On a second His and Hers farm, Her houses were down to 20 mL/min because she was trying to avoid wet floors. Yet His houses yielded a 1.83 feed conversion ratio compared to Her 1.98 due to His better flow rate. She was trying to solve a problem by turning water flow down, but she would have done better to address the wet floors by looking at ventilation and the maintenance and condition of the waterers.

### Easy fix for flow rate problem

All of the previous data were collected in Mississippi. However, on Georgia farms, flow rates measured at 15 and 25 mL/min produced far lower weight gains (1,975 and 1,980g) than flow rates of 70 and 75 mL/min (2,220 and 2,290g), respectively.

The take home message of these data is: “Know your nipple flow rate because low flow rates decrease bird performance.” Just because water droplets are hanging from nipples and there’s water in the cups does not mean birds are receiving an adequate water flow rate to perform at an optimal rate. Here’s the fix. Every year or so, take 30–60 minutes to calibrate each house. After this, you can spot check in 5 minutes and make adjustments to insure flow rates are still as they should be for optimal growth. ■