THE EFFICACY OF NIPPLE DRINKERS IN TURKEY PRODUCTION

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Summary

With the constant effort to improve production efficiency, the turkey industry is currently looking at nipple drinkers as a possible alternative to traditional open drinker systems. Nipple drinkers offer a wide range of advantages over the traditional systems including cleaner, less contaminated drinking water, drier litter which reduces pathogen load, as well as being less labor intensive because nipple drinkers do not have to be cleaned. The purpose of these studies was to test the efficacy of nipple drinkers for rearing turkeys. For trial one, Large White commercial toms were grown to 20 weeks of age in 48 pens. There were 6 different drinkers tested including the control and 5 nipple drinker systems. The control was the Plasson Turkey Bell and the nipple drinker systems tested were the Plasson Easy Start, Valco Turkey Drinker, Lubing Traditional (commercially known as FeatherSoft® high flow nipple with Littergard®), Lubing Easy Line, and Ziggity Big-Z Activator. Body weight, feed conversion, and feed consumption were measured through out the study. In trial two, Large White commercial hens were raised to 14 weeks in 48 pens. All variables and procedures were the similar to those in the tom study. Litter moisture was measured beneath the drinker at 6 and 20 weeks in trial one only.

Nipple drinkers were found to have a significant effect on body weight. As seen in other studies, birds on nipple drinkers experienced reduced body weights, particularly during the time of most rapid growth. However, in some cases, the birds experienced what one might regard as apparent compensatory growth. Feed conversion was not initially effected by drinker type. It was not until the end of the trial one between 15 and 20 weeks of age, that feed conversion was significantly different. In trial two, feed conversion was only significant at 8 weeks. Feed consumption, like feed conversion, was not significant until the last period of the first trial. Feed consumption was significant throughout trial two. Litter moisture beneath the drinkers in trial one was found to be significant at 6 and 20 weeks. The results of this study concur with the results of other studies that were similarly conducted. We conclude that nipple drinkers can be an alternative to traditional open watering systems particularly during brooding. It can also be concluded that a combination of nipple drinkers during brooding and open watering systems during grow-out may also be successful.

Introduction

In the broiler industry, nipple drinkers are considered the most effective watering method. When compared to conventional drinker systems, they can deliver comparable body weights, improved feed conversion, and lower mortality. Recently, the turkey industry has expressed interest in nipple drinkers wanting to capitalize on the success of the broiler industry. According to Wabeck (1994), nipple drinkers deliver fresh, less contaminated drinking water resulting in healthier birds. Wabeck (1994) also points out that with nipple drinkers there is less water wastage which yields drier litter. Intuitively, if the litter is drier, pathogen load is reduced.

Michel, et.al. (1998) noted that wet litter from water spillage can be attributed to an increase in ammonia in the litter, increased incidence of disease, and even foot problems in birds. From this, it can be concluded that drier litter and reduced pathogen load can overall improve the performance of a bird because of a more sanitary environment. Another advantage of nipple drinkers is the reduction in labor requirements. Unlike bell drinkers, nipple drinkers do not have to be cleaned which saves growers time and labor costs (May, et.al. 1997). The objective of these studies was to test the efficacy of nipple drinkers on turkey performance.

Materials and Methods

For trail one, commercial Large White B.U.T.A. tom turkeys were reared to 20 weeks of age. There were 6 drinker systems tested in 48 pens (8 pens/trt). There were 18 birds per pen (64 ft^2/pen), and supplemental drinkers were used for the first 3 days in half of the pens. The feed for these studies was commercially manufactured and the diets were typical of those used in commercial turkey production. For trial two, commercial Large White Hybrid Converter® hens were raised to 18 weeks of age in the same pens. The same treatments were applied in the same design as trial one for trial two. There were 30 birds started per pen. Each pen area was restricted with a wire partition to approximately 40 ft^2. This provided 1.3 ft^2 per bird during brooding. At six week of age the partition was removed providing 2.1 ft^2 per bird. Supplemental drinkers were used in half the pens, randomized evenly over treatments, through one week of age.

The control was the conventional bell drinker – the mini bell during brooding and the turkey bell during grow-out. There were 5 nipple systems tested and compared to the control: Plasson Easy Start, ValCo Turkey Drinker, Lubing Traditional (FeatherSoft® high flow nipple with Littergard®), Lubing EasyLine™, and Ziggity Big-Z Activator. All of the nipples remained until at least 6 weeks of age to simulate commercial brooding duration. At that point, the nipples were changed to the Plasson Turkey Bell as they fell behind the control. In trial one, the ValCo and Lubing EasyLine™ remained to 20 weeks at the request of those companies. The Lubing Traditional was changed at 6 weeks, the Ziggity Big-Z Activator was changed at 7 weeks, and the Plasson Easy Start at 8 weeks. In trail 2, the Lubing Traditional nipple was again changed at 6 weeks. All other drinkers were intended to remain throughout the trial.

Over the course of the studies, several measurements were taken. Body weight and feed consumption, by pen, were measured at all data collection dates: 3, 5, 6-8, 10, 12, 15, and 20 weeks in trial one, and 1, 3, 5, 6, 8, 10, 12, and 14 weeks in trial two. Body weight was measured in trial one by pen at 3 and 5 weeks and at 1 and 3 weeks in trial two. Individual body weights were taken at all subsequent weight dates in each trial. Period and cumulative feed conversions were calculated. Litter moisture was also measured beneath the drinkers at 6 and 20 weeks in trial one.

Results

Trial 1: There were no significant differences in mortality between any treatment groups for either trial. There was 2% mortality during brooding, and livability was 95% over the course of the entire first trail (data not shown). Body weight data for trail one are shown in Table 1. Nipple drinkers were shown to have a significant effect on body weight in both trials. By 3 weeks, the mean body weight of the birds on the Lubing Traditional nipple was significantly less than the mean body weights of the birds on all the other drinkers. At 3 and 5 weeks, mean body weights of birds on the Ziggity drinker were significantly greater than the birds on the lubing traditional nipple but significantly less than the control with the other drinkers being intermediate. These differences remained, and at 10 weeks, the birds on the Ziggity drinker had comparable

body weights to those birds on the Lubing Traditional nipple. At 6 weeks, the mean body weights of the birds on the Plasson Easy Start were significantly less than control birds. By 7 weeks, birds all of the nipple drinkers had lower body weights than control birds. Significant differences in body weights remained until 12 weeks when some of the birds on the nipple drinkers appeared to catch up. This apparent compensatory growth was occurred with the drinkers being changed to the Plasson Turkey Bell. Changing the drinker gave the birds that had previously been on nipple drinkers access to open water during the later periods of growth. The results of trial one showed that at 15 weeks, there was even less difference in body weights, and by 20 weeks, only the birds on the Lubing Traditional nipples and the ValCo Turkey Drinker were significantly less than all the other drinkers. By the end of trial one, it was apparent that some of the birds had actually experienced some compensatory growth and caught up to the controls.

Table 1. The effect of drinker type on tom body weight during Trail 1.

Body Weight (lbs)	3 weeks	5 weeks	6 weeks	7 weeks	8 weeks	10 weeks	12 weeks	15 weeks	20 weeks
Plasson Bell	1.58[a]	3.89[a]	5.50[a]	7.59[a]	9.75[a]	15.59[a]	21.43[a]	30.27[a]	46.79[a]
Plasson Nipple	1.55[ab]	3.81[ab]	5.21[b]	7.22[b]	9.33[b]	14.96[b]	20.70[a]	30.01[a]	46.62[a]
Lubing Traditional	1.42[c]	3.28[c]	4.49[c]	6.47[c]	8.47[c]	13.75[c]	19.69[b]	28.69[b]	45.47[b]
Lubing Easy Line	1.56[ab]	3.85[ab]	5.37[ab]	7.35[b]	9.37[b]	15.11[b]	20.86[a]	30.40[a]	46.93[a]
ValCo	1.54[ab]	3.83[ab]	5.32[ab]	7.30[b]	9.33[b]	14.83[b]	19.73[b]	29.33[ab]	45.21[b]
Ziggity	1.52[b]	3.76[b]	5.21[b]	7.22[b]	9.26[b]	14.92[b]	20.79[a]	29.96[a]	46.66[a]

In trial one, feed conversion was not initially affected by drinker type (Table 2). Until 15 weeks, feed conversion was similar between drinker types. Feed conversion was only significant in the period between 15 and 20 weeks. The birds on the Lubing Traditional nipple had significantly improved feed conversion, but this can be attributed to their reduced body weight. The birds on the Lubing EasyLine™ also showed significantly improved feed conversion while maintaining comparable body weights to the controls. These results could be because of the nipple drinker itself which delivers clean, fresh water and maintained drier litter which would overall improve growing conditions and reduce stress. The Plasson Easy Start and the ValCo Turkey Drinker had feed conversions intermediate to the other drinkers.

Table 2. The effect of drinker type on tom cumulative feed conversion during Trial 1.

Feed Conversion	6 weeks	20 weeks
Plasson Bell	1.56	2.62[a]
Plasson Nipple	1.55	2.55[ab]
Lubing Traditional	1.58	2.49[b]
Lubing Easy Line	1.57	2.51[b]
ValCo	1.56	2.54[ab]
Ziggity	1.57	2.63[a]

Feed consumption data for trail one are presented in Table 3. Feed consumption, like feed conversion, was similar among all drinker types until the last period of the study between 15 and 20 weeks. At 20 weeks, the Lubing EasyLine™ had the highest feed consumption and the Valco Turkey Drinker had significantly less with the other drinkers being intermediate. It should be noted that by the end of the study, the birds on the ValCo Turkey Drinker had the most reduced body weight which could explain the reduced feed consumption.

Table 3. The effect of drinker type on tom feed consumption (lbs per bird) during Trial 1.

Feed Consumption (lbs)	6 weeks	20 weeks
Plasson Bell	8.6	121.3[a]
Plasson Nipple	8.2	118.7[ab]
Lubing Traditional	7.1	113.3[b]
Lubing Easy Line	8.5	117.8[ab]
ValCo	8.3	115.1[b]
Ziggity	8.2	122.8[a]

Litter moisture was measured at 6 and 20 weeks in Trial one (Table 4). This was a composite sample taken directly beneath the drinker. At 6 weeks, litter moisture from beneath all drinker types was significantly less, except the ValCo Turkey Drinker, compared to the control. At 20 weeks, only those drinkers that remained throughout the entire length of the trial were tested: the Lubing EasyLine™, the Valco Turkey Drinker, and the Plasson Turkey Bell. Litter moisture beneath the drinker was significantly more for the ValCo Turkey Drinker compared to the Plasson Turkey Bell. The Lubing EasyLine™ had similar litter moisture as the controls. Litter quality was observably better beneath the nipple drinkers as compared to the control Plasson Turkey Bells. This was true even at 20 weeks when there is not a significant difference in moisture. We observed less cake and overall better little quality in the nipple drinker pens.

Table 4. The effect of drinker type on percent litter moisture (%) during Trial 1.

Litter Moisture (%)	6 weeks	20 weeks
Plasson Bell	49[a]	57[b]
Plasson Nipple	34[b]	--
Lubing Traditional	28[b]	--
Lubing Easy Line	34[b]	54[b]
ValCo	51[a]	64[a]
Ziggity	29[b]	--

Trail 2: Trial two had similar mortality data as Trial 1 (data not shown). Table 5 contains trial two hen body weight data. Hens on the Lubing EasyLine™ and ValCo drinkers had similar body weights compared to the control birds all through Trial two until 14 weeks of age. Hens on the Lubing Traditional nipples had reduced body weights compared to the controls by 3 weeks of age. They were switched to the Turkey Bells at 6 weeks. They continued to have reduced body weights compared to the controls until 14 weeks of age when they had similar weight. The hens on the Plasson Easy Start drinkers had reduced body weight compared to the control birds from 6 until 12 weeks of age. At 14 weeks of age their body weights were again similar to the body weights of the hens on the control drinkers. The hens on the Ziggity waterers had reduced body weights compared to the control birds from 6 to 14 weeks.

Table 5. The effect of drinker type on hen body weight during Trial 2.

Body Weight (lbs)	1 weeks	3 weeks	5 weeks	6 weeks	8 weeks	10 weeks	12 weeks	14 weeks
Bell	.722	1.26[a]	3.23[a]	4.49[a]	7.85[a]	11.44[a]	14.19[a]	17.36[a]
Lubing EasyLine	.741	1.27[a]	3.21[a]	4.44[ab]	7.79[a]	11.48[a]	14.19[a]	17.27[a]
Lubing Traditional	.730	1.19[b]	2.90[b]	3.85[c]	7.15[c]	10.91[c]	13.77[b]	17.31[a]
Plasson Easy Start	.741	1.27[a]	3.26[a]	4.38[b]	7.63[b]	11.19[b]	13.82[b]	17.12[a]
ValCo	.730	1.26[a]	3.26[a]	4.49[a]	7.74[a]	11.37[ab]	14.06[a]	17.34[a]
Ziggity	.726	1.28[a]	3.21[a]	4.33[b]	7.48[b]	10.97[c]	13.53[c]	16.65[b]

In trial two, feed conversion was only significant by drinker type at 8 weeks of age (Table 6). Hens on the Lubing Traditional nipples had reduced feed conversion compared to the control birds. Howver, by 14 weeks of age, birds on all treatments had similar feed conversions.

Table 6. The effect of drinker type on hen cumulative feed conversion during Trial 2.

Feed Conversion	6 weeks	8 weeks	14 weeks
Plasson Bell	1.18	1.40[a]	2.24
Lubing EasyLine	1.20	1.41[a]	2.25
Lubing Traditional	1.14	1.35[b]	2.20
Plasson Easy Start	1.19	1.41[a]	2.23
ValCo	1.18	1.41[a]	2.20
Ziggity	1.21	1.41[a]	2.16

Feed consumption was significantly different throughout trial two (Table 7). Feed consumption seemed to follow the water restriction patterns. The birds with the lowest body weight, and presumably with the greatest water restriction, also had the lowest feed consumption. For example, the hens on the Lubing Traditional nipple had significantly decreased feed consumption compared to controls. However, when the drinker was changed to an open waterer, the feed consumption increased. By 14 weeks of age, the feed conversion of birds on the Lubing Traditional nipples was no longer significantly different from the feed conversion of the controls. Hens on the ValCo and Ziggity systems had similar feed consumption at 6 weeks of age but reduced feed consumption by 14 weeks of age compared to the controls.

Table 7. The effect of drinker type on hen feed consumption (lbs per bird) during Trial 2.

Feed Consumption (lbs)	6 weeks	14 weeks
Plasson Bell	1.35[a]	10.89[a]
Lubing EasyLine	1.34[a]	11.00[a]
Lubing Traditional	.85[b]	11.23[a]
Plasson Easy Start	1.34[a]	10.51[b]
ValCo	1.34[a]	10.39[b]
Ziggity	1.29[a]	9.83[b]

Discussion

The use of nipple drinkers for turkey rearing has shown mixed results. Hulet (1999) found that nipple drinkers were effective in brooding conditions or up to 10 weeks of age. However, the results of this study showed, similar to others, reduced body weights with comparable and improved feed conversion. In a field trial by Rives (2001), body weights seem to be reduced at 5-6 weeks, but stabilize by 10-12 weeks when put back on the Plasson Turkey Bell for the grow-out phase. Our studies, like the Rives (2001) field trial, showed that birds experienced compensatory growth when put back on the Plasson Turkey Bell. Both these studies and the Rives (2001) field trial concluded that a combination of the two drinker types may be optimal in certain instances. For example: in trial one, birds which were brooded on the Plasson Easy Start and Ziggity and then switched to the turkey bell performed as well as the control birds. However, some new systems seem to work well for the entire life of the flock. Birds on the lubing easy line, which remained throughout the study, exhibited comparable performance to that seen of birds on the conventional Plasson Turkey Bell.

In general, turkeys reared on nipple drinkers experienced decreased body weight, improved feed conversion, and improved bird health. However, the Hulet (1999) study also noted many advantages of nipple drinkers that can offset the disadvantage of reduced body weight. On a performance basis, even though body weight is reduced, feed conversion is greatly improved, and overall bird health is improved due to the access to clean, less contaminated drinking water. Since nipple drinkers are a closed system, they maintain drier litter which also contributes to improved growing conditions. Practically, nipple systems provide growers with a labor saving alternative to traditional open-water systems. Nipple drinkers need less cleaning and maintenance and allow for easier administration and less wasting of vaccinations and medications.

References

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