MANAGING BROILERS IN THE HIGH ALTITUDES OF THE ANDES MOUNTAINS

The biggest obstacle in raising broilers in high altitudes is the ascites syndrome. This condition can be characterized by an accumulation of fluid in the abdominal cavity and elevated mortality that tends to peak between 4-6 weeks of age. Although the symptoms of ascites can be seen in lower elevations, particularly in the wintertime, they generally become progressively worse with increasing altitudes above 1200 meters (4000 ft.). This can be a serious problem in countries such as Mexico, Colombia, Ecuador, Peru, and Bolivia where many commercial broiler farms are located between 2000-2800 meters (6600-9200 ft.). The typical range of the mortality is 8-12%, with a few cases as high as 25%. In addition, many of the surviving birds may be condemned in the processing plant. However, some farms are routinely obtaining low mortality of 3-5% with minimal problems from ascites. They are achieving this primarily by using good management practices to reduce or avoid the factors that cause this costly syndrome.

The ascites syndrome results from a deficiency of oxygen supply to the tissues and/or an increased metabolic demand. The right ventricle of the heart, which pumps blood to the lungs, tries to compensate for the oxygen deficiency by pumping harder. This increases the pressure in the pulmonary vessels causing blood to back up and the heart to enlarge. In the process, the blood pressure is increased in the liver and abdominal veins, forcing plasma into the abdominal cavity — thus, the common term “water belly”.

There are a multitude of factors that can create an oxygen deficiency in the tissues. Heading the list is the reduced oxygen content of the air at high altitudes. Many other factors directly or indirectly alter the function of the respiratory tract and cardiovascular system. Some of these include poor quality chicks (undeveloped or damaged systems), dust, ammonia, vaccine reactions, respiratory disease, aspergillosis, other diseases that generally weaken the chick or impair the immune system, and feed contaminants.

The single most important factor that increases metabolic demand for oxygen in high altitudes is low house temperature. The non-insulated naturally ventilated broiler house commonly used in higher elevations makes it difficult to provide the desired temperature control. In addition, artificial heat is used quite sparingly due to the high cost of heating fuel. In an attempt to maintain their core body temperature in cold temperatures, broilers increase their metabolism, and thus their oxygen demand. Unfortunately, the very young chick can’t adjust its metabolism very well until 14-21 days of age. Consequently, if the air and/or litter temperature is not proper in the brooding area, the core body temperature will drop. Many of these chicks will cull out or die early. The stressed survivors will usually be more susceptible to ascites.

Another very important factor related to increased oxygen demand is fast growth. Thus, as expected, males tend to have more ascites problems than the slower growing females. To further complicate the problem, today’s broiler also has more meat yield than before, which adds to the metabolic demand for oxygen.

Management Recommendations

Some companies are experiencing minimal problems from ascites on farms in very high altitudes. They are using a comprehensive program of body weight control along with giving strict daily attention to the comfort, health and welfare of the birds throughout the growing period. The broiler managers of these companies realize that any chicks that become even slightly chilled or do not eat or drink properly for just a few hours during the early brooding period will most likely die later on from ascites. The following recommendations are primarily based on the successful management practices of these farms. They are offered for consideration to minimize most of the factors associated with ascites while obtaining reasonable growth rate and feed conversion.

Chick Quality

Any weak, dehydrated or cull chicks will be susceptible to ascites. Therefore, the broiler producer must insist upon the delivery of good quality chicks. There are many factors involved in hatchery management that can affect chick quality. One important factor is the ventilation of the hatchery building and machines. This is especially important when the chicks are piping. When the chicks start to breathe air, the level of oxygen must be enough for proper maturation of the respiratory tract and the heart. If sufficient air exchange does not occur during the preparation for hatch, the chicks may most certainly be predisposed to ascites.

Temperature Control

Although the open-type house commonly found in the high altitude growing areas is not ideal for that type of climate, certain modifications and management practices can be used to improve the temperature control. The open sidewalls should be closed with a commercially made curtain or a double layer of thick plastic to prevent any cold drafts. Likewise, any cracks around the doors should be sealed.

One should use a minimum of 10 cm (4 inches) of clean litter. Assuming that the brooding area has been preheated prior to their arrival, this will insulate the floor and serve as a heat reservoir for the day-old chicks. The brooding area should be confined within a group of plastic brooding compartments (tents). These are erected along the length of the house by suspending sheets of thick plastic about 1/2-3/4 meters (20-30 inches) from the inside of the roof and sidewalls. The brooding compartments should not be airtight in order to maintain proper air quality.

The following is a description of a typical tent setup used by one successful company. Within each tent are four brooding rings. Each ring is 4 meters (13 feet) in diameter. The ring is constructed of solid cardboard 40 cm (18 inches) high. There is just enough space to walk around the outside of each ring. Each ring has an infrared brooder stove, suspended over the center, along with 6 feeder lids and chick waterers. Six hundred fifty to seven hundred chicks of one sex are placed per ring.

Brooding

The brooder stoves should be turned on at least 24 hours before the chicks arrive to preheat the air at chick level and the litter. Note: If the litter temperature is cool, the chicks will not spread out in the brooder ring to eat and drink properly. This can lead to an increase in early mortality (starve-outs) and cull chicks.

Experience in the field has shown that an initial brooding temperature of 34-35º C (93-95º F) in the high altitude areas for the first week provides better comfort and less ascites than the traditional temperature of 32º C (90º F) used at lower elevations. This temperature is measured at the edge of the brooding ring, 8 cm (3 inches) from the litter — chick level.

One broiler farm located at 2600 meters (8600 ft.) ran an experiment to compare the 35º C (95º F) first week brooding temperature versus 32º C (90º F). The temperature treatment after 7 days was the same for both groups. The 32º C (90º F) group of broilers had a total mortality of 9% (4-5% was ascites) to 38 days of age compared to only 3% total mortality for the 35º C (95º F) group. Is the first week brooding temperature important? ABSOLUTELY!

The possible reason for the effectiveness of the higher temperature is lower humidity. The chicks feel comfortable at a certain combination of dry bulb temperature and humidity. High humidity increases the apparent temperature (what the chick feels) at a given dry bulb temperature, whereas, low humidity decreases it. The recommended humidity during the first 3 weeks is 55-60% and 60-70% thereafter. These humidity levels are usually reached at the lower elevations. However, in the brooding tents at the high elevations, the humidity can be in the 30-40% range. This is even after the questionable benefit of placing a pan of water (out of reach of the chicks) in each brooder ring for the first week to augment the humidity.

Note: One should observe the behavior of the chicks throughout the brooding period to determine if the existing temperature needs to be adjusted.

The temperature should be lowered to 30º C (86º F) the second week, followed by 3º C (5º F) reductions per week until a house temperature of 20-21º C (68-70º F) is reached. The temperature reduction can be accomplished by a combination of reducing the brooder stove output and gradually expanding each brooder ring, then later connecting several rings, etc. until the chicks have full use of the brooding tent. The plastic tents can usually be removed by 21-24 days of age and the brooder stoves can be shut off by 28-30 days of age. Throughout the remainder of the growing period, good air quality and a minimum inside temperature at bird level of 20-21º C (68-70º F) should be maintained.

This is accomplished with the manipulation of the heat production from the birds themselves and the sidewall curtains.

It is recognized that that brooder fuel can be very expensive, and thus there is a tendency to limit the use of brooder stoves. This, however, is not cost effective if it results in excessive ascites mortality. One should highly consider using the brooder stoves until at least 28-30 days of age on the high altitude farms. At lower elevations, 1200-1600 meters (4000-5000 ft.), perhaps it would only be necessary to use them to 12-18 days of age, depending on the local conditions. It also may only be necessary to use the 35º C (95º F) initial brooding temperature for the first 3 days followed by 32º C (90º F) for the rest of the week. After that, one can use a temperature reduction program as previously described.

Growth Control

Since growth rate is a significant risk factor in the development of ascites, the body weight gain has to be controlled throughout the growing period. This is achieved with a feed restriction program and the limited use, if any, of pelleted feed. Since males grow faster than females, one should consider raising the broilers sex-separate to better implement the feed restriction program. Note: Because, it is VERY important that all of the chicks learn to eat and drink as soon as possible from the permanent equipment to avoid producing some unnecessary cull chicks, the supplemental feeders and waterers should be removed gradually from the brooding tents between 7-10 days of age.

The exact amount of feed required to achieve the weekly body weight goals may vary from farm to farm, depending on altitude, feed quality, temperature, etc. At 1800-2500 meters (6000-8000 ft), the usual male body weight goal at 42 days of age is about 90% of the potential weight of full-fed males under similar environmental and lighting conditions. The female body weight goal is approximately 83-84% of its full-fed potential. The growth rate of broilers at even higher elevations may have to be more severely restricted to avoid ascites. Broilers grown at lower elevations would probably be less restricted.

If one is restricting growth rate, birds must be weighed on a regular basis. Ideally, a sample should be weighed two times a week. For example, on the weekly birthday and 3-4 days before and after, samples of 50-75 birds should be taken in two locations in each house. If it is noticed that the weight is not on target, corrective action can be taken quickly with a change in the feed consumption. This also allows the manager to take corrective action sooner, rather than waiting 7 days, if there is a water consumption problem, feed quality problem, disease, etc.

Feed Type

Feed a mash or small particle crumbled starter ration to 18-20 days of age to both males and females. This can be followed by a mash-type grower feed until the broilers are marketed. It is well documented that mash feed slows down feed consumption and, thus, helps slow down growth rate. However, some companies finish the last one or two weeks of the growout period with a pelleted feed. They feel that this improves the feed conversion ratio without any adverse effect on the ascites mortality. The main disadvantage of using mash feed is it is more difficult to "flow" in the feed bins and non-mechanical feeders.

Lighting Program

Since the daily amount of restricted feed is usually consumed in less than 12 hours, it is not necessary to use artificial light in the broiler house. The one exception would be if the average weight of the chicks is less than 40 grams — from eggs of a young breeder flock. One should increase the feed consumption of these chicks for the first 4-7 days by giving up to 18 hours of total light during that period. This should allow them to be on the body weight goal by 7 days of age.

Vaccination Program

Almost all diseases can directly or indirectly affect the incidence of ascites, particularly respiratory diseases such as Bronchitis, Newcastle, mycoplasma, and colibacillosis. It is extremely important to have a complete disease prevention program on each farm that would include high biosecurity, optimum maternal antibodies for the prevalent diseases in the area and a well designed vaccination program with minimal vaccine reactions.

Summary

Preventing or reducing the effects of the ascites syndrome is the biggest challenge in raising broilers in the high altitude areas. However, it can be done! There are companies routinely obtaining flocks with low mortality and acceptable body weight and feed conversion ratios. They are achieving these results with a complete program of strict brooding and temperature control practices, body weight restriction and disease prevention. These companies realize that there is very little room for errors or management mistakes in the high altitude growing areas.

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