

**Al+Clear<sup>®</sup> Poultry Grade Alum (Dry)**  
**Al+Clear<sup>®</sup> A7 (Liquid)**

## TECHNICAL BULLETIN

## Foot Pad Dermatitis: Cause, Prevention and Monitoring Technique



### INTRODUCTION

Over the past few years chicken paws that are sold primarily for export into oriental markets have been a very profitable part of the poultry industries product mix. In times when other segments of poultry products declined in price, paws prices have consistently remained strong.

For this reason a great deal of emphasis has been placed in recent years on improving paw quality. Beside the monetary importance of sellable paws to the bottom line, good foot pad health is important with regard to achieving acceptable gait scores that have been imposed by some countries in their bird health and welfare control programs (Denmark and Sweden), Kjaer (2006), Pagazaurtundua (2006).

Major food chains in the US are also conducting welfare audits and gait scores are an integral part of their welfare assessments.

### REDUCING PAW DOWNGRADES

It goes without saying that the broiler house environment plays a major role in bird health and well-being and performance, and this is especially true in assuring healthy paws (Figure 1), hocks, and in eliminating breast spots and blisters, Berg (1998). Birds excrete uric acid in their urine which is converted to soluble ammonia through a series of hydrolytic enzyme reactions and once in the soluble form, ammonia in the litter can cause burns of foot pads. As the litter warms ammonia is volatilized affecting the bird's respiratory tract and eyes.

It has been shown that as little as 10 ppm of ammonia can cause damage to the trachea, Nagaraja et al. (1983) and according to a review by Carlile (1984) ammonia levels from 25 to 100 ppm can have significant detrimental effects on feed conversion and live weight. Controlling ammonia with litter acidifiers and maintaining dry litter are the two most effective ways to reduce foot pad dermatitis (FPD) and paw downgrades.

## Foot Pad Dermatitis

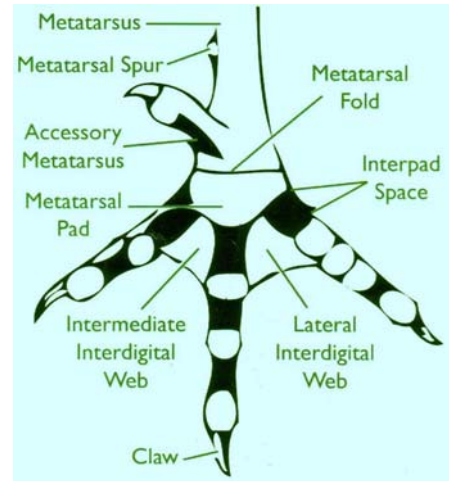
The first two weeks seem to be the most critical period in the development of FPD and it is important to pay special attention to maintaining proper nipple flow rates and proper water line height adjustments for different size birds. Water line and nipple flow rate management will have a direct impact on litter conditions and litter conditions can deteriorate rapidly the first two weeks.

It is recommended that for at least the first six weeks that the Val Formula be used when adjusting nipple flow rates [(age in weeks x 7) + 20 = ml flow rate per minute]. For example the first week a flow rate of 27 ml/min. would be used. At 3 weeks a flow rate of 41 ml/min would be used. Starting chicks off on higher flow rates will insure wet litter and all of the adverse problems that are aggravated by wet litter.

Proper ventilation is also essential in maintaining good litter quality and it is vitally important that growers understand that even though a litter amendment has eliminated or reduced ammonia levels below 25 ppm that ventilation is the only way to remove water from the broiler house. Reducing fan cycle times too low will result in moisture accumulation, wet litter and paw damage.

Another consideration is to maintain at least 4 inches of litter at all times in order to absorb and distribute the soluble ammonia away from the birds feet. One or two inches has the bird standing in ammonia and will guarantee poor quality paws.

**FIGURE 1: Anatomy of Chicken Foot (Paw)**



*Adapted from USDA/ARS Ag. Handbook 362 (1972) Avian Anatomy – Integument Part I.*

### SUMMARY

- ✎ Maintain a minimum of 4 inches of litter over the pad.
- ✎ Use the Val Formula to maintain proper flow rates up to 6 weeks of age.
- ✎ Ventilate not only to maintain low ammonia levels but also to remove moisture from the broiler house.
- ✎ Monitor litter moisture conditions daily and take corrective action when indicated.
- ✎ Use an effective litter amendment that not only controls ammonia but also dries litter which is essential in improving paw quality.
- ✎ **Al+Clear<sup>®</sup> Poultry Grade Alum (dry)** is ideal for controlling ammonia, lowering ph of litter and drying litter and pads. **Al+Clear<sup>®</sup> Liquid A7**, a second generation product, provides immediate activation coupled with exceptional extended ammonia control over a wide range of litter conditions.

## Foot Pad Dermatitis

- ☛ Biotin (Kjaer et al, 2006; Mayne, 2004) has been shown to have a positive impact on foot pad health.
- ☛ Poor quality litter (wood chips) contain more splinters than used litter. This can result in skin punctures and have a negative impact on paw quality (Tilley et al., 1990).

### FIELD GRADING GUIDE

1. No discoloration – clean paw, no lesions  
= **sellable**.
2. Some discoloration but no breaks in the skin  
= **sellable**.
3. Dark discoloration, associated with ulcerations and inflammation but less than the size of a pencil eraser = **sellable**.
4. Dark discoloration, associated with ulcerations and inflammation with lesions larger than a pencil eraser = **downgrade**.



### REFERENCES

1. C.C. Berg (1998) *Doctoral Thesis: Swedish University of Agricultural Sciences, Uppsala, Sweden.*
2. J.B. Kjaer et al. (2006) *Poultry Science* 85:1342-1348.
3. M. Nagaraj et al. (2007) *J. Appl. Poult. Res.* 16:255-261.
4. Pagazaurtundua and P.D. Warriss (2006) *The Veterinary Record.*
5. W.D. Weaver and R. Meuerhof (1991) *Poultry Sci.* 70:746-755.
6. R.K. Mayne (2004) *World Poultry Science* 61:256-267.
7. B.J. Tilley et al. (1990) *Poultry Science Supplement: 195.*

**Author: Dr. P.A. Welch**  
**Published: 6-28-08**

### CORPORATE HEADQUARTERS

General Chemical LLC  
90 East Halsey Road  
Parsippany, NJ 07054



#### CUSTOMER AND TECHNICAL SERVICE

**Rex Johns (479) 236-8767**  
**Kerry Preslar (770) 330-1206**  
**Dr. Pat Welch (601) 319-5944**

#### WEBSITE

**[www.GeneralChemical.com](http://www.GeneralChemical.com)**