

Prevention and Scoring of Paw Lesions: A New Approach

Fifteen years ago, who would have thought that chicken paws would have become such an important part of the U.S. poultry industry? Today, good paws are integral to a complex's profitability and are quite often the most profitable part of the chicken. The presence of paw or footpad lesions (pododermatitis or footpad dermatitis) is the number one cause of downgrades of chicken feet. Since there is no market for Grade "B" paws, the presence of footpad lesions can seriously erode a complex's bottom line.

Pododermatitis or footpad dermatitis (FPD) is an erosion or ulceration on the bottom of a bird's foot most frequently caused by ammonia burns. The large weight bearing, metatarsal pad is most frequently affected, while in severe cases the digital pads and the interdigital webs between the toes are also affected. In very severe cases, the hock region can also be involved. Hock involvement is most commonly seen with straw based litter and so it is rare to see this in U.S. poultry production. Refer to Figure 1 for understanding the anatomy of the paw.

Factors In The Development Of FPD

Much attention has been paid to the condition of the litter in the last week or so of a bird's life in regards to FPD development. However, paw lesions begin to form in the first week of the bird's life. The formation of liquid ammonia at the litter surface occurs anywhere there is even the least bit of damp litter. The severity and moistness of the cake present in the houses seems to play the predominant role in lesion development.

Common culprits are small wet spots under the drinkers (commonly referred to as donuts) and caked areas along the sidewalls. When newly hatched chicks step onto those damp areas, the litter sticks to their feet and ammonia in the litter begins to erode the skin. Visible paw lesions are evident by the time the bird is 7 days old and the lesions continue to worsen over time.

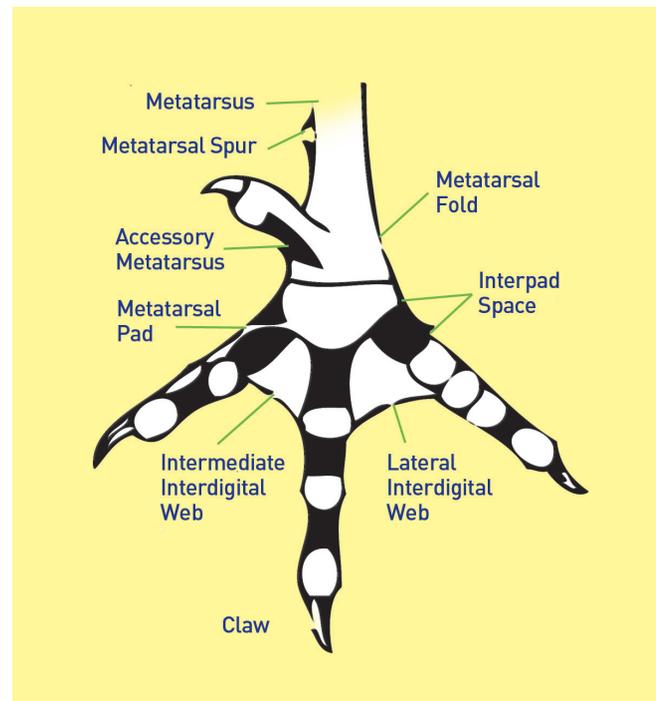


Figure 1: Anatomy of the Paw



Figure 2 shows severe lesions on a 7 day old bird. Serial examination of these birds shows that the lesions do not heal even if the litter dries out. Surprisingly, in houses with dry litter, the bottoms of the birds' feet are very clean and it is unusual to find a footpad lesion on a bird with clean feet. Ambient ammonia levels do not seem to influence the development of FPD. The two factors that need to be present for lesion development are substantial levels of ammonia deep in the litter and moisture at the litter surface.

Ammonia in the gas phase does not seem to be sufficiently irritating to the skin of the feet. Ammonia in solution, however, in the damp areas of the litter is corrosive to the skin and causes FPD development. Houses with no or low ammonia at bird level can still have a substantial percentage of FPD if the litter is damp. This is most commonly seen in brand new houses or on new litter where the relative humidity is high even though the ammonia is not, and litter slicking occurs. At the same time, houses that have quarter-size donuts under the drinkers due to leaky nipples but very dry litter otherwise, will still have a substantial number of birds with paw lesions.

Preventing FPD

The three keys to preventing paw lesions are to ventilate poultry houses for relative humidity (RH) in order to prevent moisture build-up around the drinker/feeder lines and the sidewalls, manage drinkers to prevent leaks, and acidify the litter surface to neutralize ammonia. In houses that are ventilated through a curtain crack or fixed inlet boards ventilating for RH is difficult as air entering the houses does not have sufficient velocity to flow across the ceiling but rather drops straight to the floor dumping moisture along with it. In a study conducted by Weaver and Meuerhof (1991), raising birds at a 45% RH compared to a 75% RH reduced paw lesions substantially. Birds in the 75% RH group had three times the ammonia burns on the feet and the severity of the lesions was greater than those birds raised in the 45% RH group. In addition to decreasing moisture at the litter surface, acidification of the litter with PLT® litter acidifier to neutralize the ammonia that is in solution is also important. Using the appropriate rate of PLT® for the litter age and applying a little extra in the damp areas will help to neutralize the ammonia in solution.

Scoring System For FPD

In the European Union, FPD scoring is often used as an indicator of animal welfare conditions during the live production phase. The FPD scoring systems reported in the poultry literature such as the Ekstrand score (Ekstrand et al. 1998) and the modified Ekstrand score



Figure 2: Severe Lesions, 7 Day Old Bird

(Pagazaurtundua and Warriss, 2006) are the ones that have been developed in the EU strictly for this purpose. In these scoring systems, the total surface area that the lesions cover determines the foot score rather than the depth of the lesion.

These scoring systems are also designed for use at processing in order to evaluate the performance of farms that may not be vertically integrated with the plant. For processing plants in the United States, however, paws are evaluated for their export potential and not for animal welfare reasons. The USDA grading measurements are far stricter than the animal welfare measurements of the EU. USDA classifies ammonia burns as a “resolving or healing wound” and allows 13 small (≤ 0.5 inches), 6 medium (> 0.5 to 1 inch), or 3 large (> 1 inch) lesions per sample size of 50 randomly selected feet. In order for a FPD scoring system to be useful in the US, a scale matching the USDA grading system is needed. In addition, a scoring system that can be used in the field on young birds as a predictor of how a flock will grade at processing is useful.

After several evaluations of a large number of birds on a wide variety of farms, the following three score system was devised for scoring birds at 7-10 days of age in order to predict how a flock will grade at the processing plant. Scoring birds at this age allows remedial action to be taken to prevent further deterioration of the paws, as well as makes the catching and handling easier on both the birds and the scorer.

- Only the underside of the bird's foot is scored. Paws that have attached dirt should be washed prior to scoring.
- Both paws are scored with the higher score recorded.
- A minimum of 30 birds per house should be evaluated.



Figure 3: Score of Zero

Score of Zero

A score of zero reflects a bird with no sign of redness or minor hemorrhage due to broken capillaries that look like branching thin red lines under the skin (petechiation). The skin is intact. Some staining of the footpad may be present.

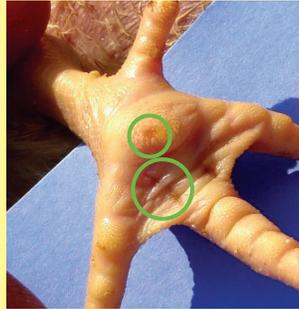


Figure 4: Score of One, Redness Without Erosion



Figure 6: Score of Two, Erosion and Cracking of the Metatarsal Pad

Score of One

Birds with a score of one have foot pads with minor redness or petechiation. A small crack in the skin may be present between individual scales. These may be as small as a pinpoint. If the foot has a callus or proliferation of the scales without a break in the skin it is classified as a one.



Figure 4: Score of One, Redness Without Erosion



Figure 7: Score of Two, Crack Between Scales of Metatarsal Pad

Score of Two

Birds with a score of two have erosions on the feet that have begun to break the skin. These can be circular or irregular shaped. Calluses or proliferation of the scales with a break in the skin are classified as a two.

Birds with a score of one will tend to present at the plant with a small lesion under 1/2 inch in size while birds with a score of two will present with lesions that are categorized as medium or large by the USDA grading system. The ratio of birds in each category may worsen by the time the birds are processing age but it rarely, if ever, gets better.

3 Keys To Prevent FPD

- ventilate for relative humidity
- prevent moist litter surface
- acidify litter

Impact Of PLT® Treatment On The Prevention Of Paw Lesions

The use of PLT® to neutralize the ammonia at the litter surface is a good management tool to help prevent the formation of footpad lesions. A demonstration in the summer and fall of 2004 showed dramatic improvement in paw quality on farms that used PLT® in the brood chamber. Ten farms (618, 204 birds) used the 50-lb rate of PLT® and six farms (463,177 birds) did not treat the litter.

The birds raised on PLT® showed significant improvement in paw quality with 55% of the birds having no paw lesions compared to only 16% of the control birds. The PLT® group had 19% fewer major paw lesions and 20% fewer minor Paw Lesions than the control birds. Performance was also much improved for the birds raised on PLT® with a three-point improvement in feed conversion (1.77 vs. 1.80) and a point better in weight.

Table 1: Foot Pad Scores (%)

	0	1	2
Control	10.3	11.0	78.7
PLT®	67.5	18.4	14.1
AI+Clear®	47.8	32.2	19.9
MicroTreat® "P"	35.6	23.0	41.4

In a controlled trial completed at Colorado Quality Research, the footpads of birds raised on untreated litter, PLT®, AI+Clear, and Microtreat-P were compared at processing. Of the birds raised on PLT, 67.5% had no lesions compared with only 10.3% of the controls (see Table 1). The use of PLT® to acidify the litter along with proper ventilation for relative humidity is successful at maximizing the number of Grade "A" paws at processing.

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