Applied scoring of integument and health in laying hens.

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Abstract. Different methods for scoring of birds' integument are often used to describe the effects of various treatments in research on the health and welfare of laying hens. Also in commercial egg production and breeding there is need for having a tool to describe the status of a certain flock of birds or a pure line. Among the main traits to score are plumage and foot condition and pecking wounds on different parts of the body. Scores for these traits may describe problems of feather pecking, perch design and litter condition and cannibalistic or aggressive behaviours respectively. Important characteristics of a scoring system are e.g. the simplicity of the system for users to learn and to use at the same time being descriptive enough in details. The present paper describes a scoring method for six body parts as regards plumage condition and for pecking wounds on comb and rear part of the body and finally, the condition of the foot as regards bumble foot syndrome. The intention is that this system should be easy to use by scorers of different background e.g. scientists, administrators, welfare inspectors, breeders and producer organisations. When used to the system scoring a bird for all characters will not exceed 30 seconds for one person.

Introduction

The status of birds' integument has a considerable impact on the interpretation of their health and welfare. This applies both to research as well as in evaluation of different housing systems in commercial production. Thus, scoring methods have been frequently used in order to assess treatment effects on health and welfare, e.g. housing conditions, feed composition, genotype, beak trimming, lighting programs, etc. The most commonly studied integument is the plumage of laying hens but also the condition of feet and skin. The appraisal of birds' integument is of value in research as well as in administration and within the industry. Explaining feather pecking activities or wear being possible causes to increases in energy requirement from poor insulation of the body are examples where scores for plumage condition may be very useful.

Several methods of scoring systems have been presented during the years. For practical reasons subjective scoring is by far the most common methods although, Fölsch et al. (1980) and Grashorn and Flock (1987) used planimetry for estimating nude areas. Two general concepts have been more common as regards subjective scoring. One is application of a general score for the plumage of the whole body already used e.g. by Hughes and Duncan (1972) or Hill (1980) and another more often used method of scoring several parts of the body individually as used by (Meunier-Salaün (1983), Tauson et al. (1984), Gunnarsson et al. (1995), Abrahamsson, (1996), Kjaer (1999), Gunnarsson (2000) and Tauson and Holm (2003) and Moe et al., (2004). The first concept gives a very general but useful assessment of the bird's integument. Adams et al. (1978) found the correlation between whole body scores given by three observers to be 0.88 which was very similar to Tauson et al. (1984) using a 1-4 point scale on five body parts and pooling them to a total. Using a 4-point scale Damme and Pirchner (1984) found good correlation between scores and weight of feathers.

However, using a total body score only can hardly explain or describe possible reasons for the deterioration of the plumage, i.e. feather pecking (Freire et al. 1999; Kjaer, 2000) *or* wear from different parts of the environment (Tauson, 1984). Neither can this method give us an idea of levels of heat losses from different parts of the body (Peguri and Coon, 1993). For instance bad condition of feathers of the tail or rump tells us that feather pecking is probably the main reason to plumage deterioration however, still not causing major heat losses while the same damage to back and breast region may cause severe heat losses and excessive energy intake due to poor insulation.

There are some crucial characteristics a scoring system must fulfil – it should be simple to apply and not too time consuming as well as showing good repeatability, i.e. being able to show the same statistical differences between possible treatments compared. Tauson et al. (1984) showed that scores given by two different independent scorers were both able to detect the same statistical differences between e.g. different cage designs. They used a 1-4 point scale on 5 individual body parts. The number of parts the body is split into and the number of available scores given for each part offer different degrees of exact description of the status of a bird. Gunnarsson (2000) reported good inter-observer agreement using a very detailed scoring method for the integument of the birds using a much as 11 body parts for the plumage condition. However, the intention of obtaining a high degree of precision, i.e. scoring a high number of individual body parts as well as using many scores may be perceived as more complicated and time consuming especially for non experienced scorers.

Description of a new system

When working in the LAYWEL EU-project it was found that several different scoring systems have been used in different projects. Hence, for the future it was decided to propose and describe a new and practical scoring system. This comprises 6 body parts for plumage condition (neck, breast, cloaca/vent, back, wings and tail), pecking damage to skin of rear body and comb, and bumble foot lesions - all at scores of 1-4. In the present report this new system is described and photographically documented for white as well as for brown genotypes. The *higher* the score is the *better* the status of the integument. The system can be used both for comparison of scores for individual body parts (scores 1, 2, 3 or 4) or pooled for the whole body (i.e. scores 6, 7, etc. up to 24). Each score is individually illustrated for each body part by photos showing "target" birds of brown and white genotypes respectively, see Figs. 1-61. The entire documentation set including the introduction is available on the web at *www.livsmedelssverige.org/hona/scoringsystem* for use in practical scoring.

Individual scores of ≤ 2 indicate severe damage to the integument e.g. heavy feather pecking/wear, aggressive pecking to the head region or inflamed bumble foot lesions respectively. By using the sum of the *individually scored* body parts it is possible to get a good general picture of the plumage condition of a bird. Thus, a total such score of ≤ 10-12 indicates a severe damage to the plumage on the whole body (e.g. 6 x 2 = 12) or on almost all parts (e.g. 2+2+2+2+1+3) or on a large majority of the body (4+3+2+1+1+1). However, the last example of scores will not appear very frequently and in fact, any of these examples given for reaching a total score of 12 (or lower) will indicate a very poor plumage cover Similarly, an individual score of ≥ 3 and a total score of ≥ 18-20 would indicate a good feather cover.

The intention is that this system should be easy to use by scorers of different background e.g. scientists, administrators, welfare inspectors, breeders and producer organisations. When used to the system scoring a bird for all characters will not exceed 30 seconds for one person. It should provide a good picture of the integument and health of birds in research and in commercial production.

Acknowledgements

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For illustrations of the scoring system (Figs. 1-61) see the following pages!

Figs. 1-2. Target birds for the scores of 1-2 on neck of brown genotypes.
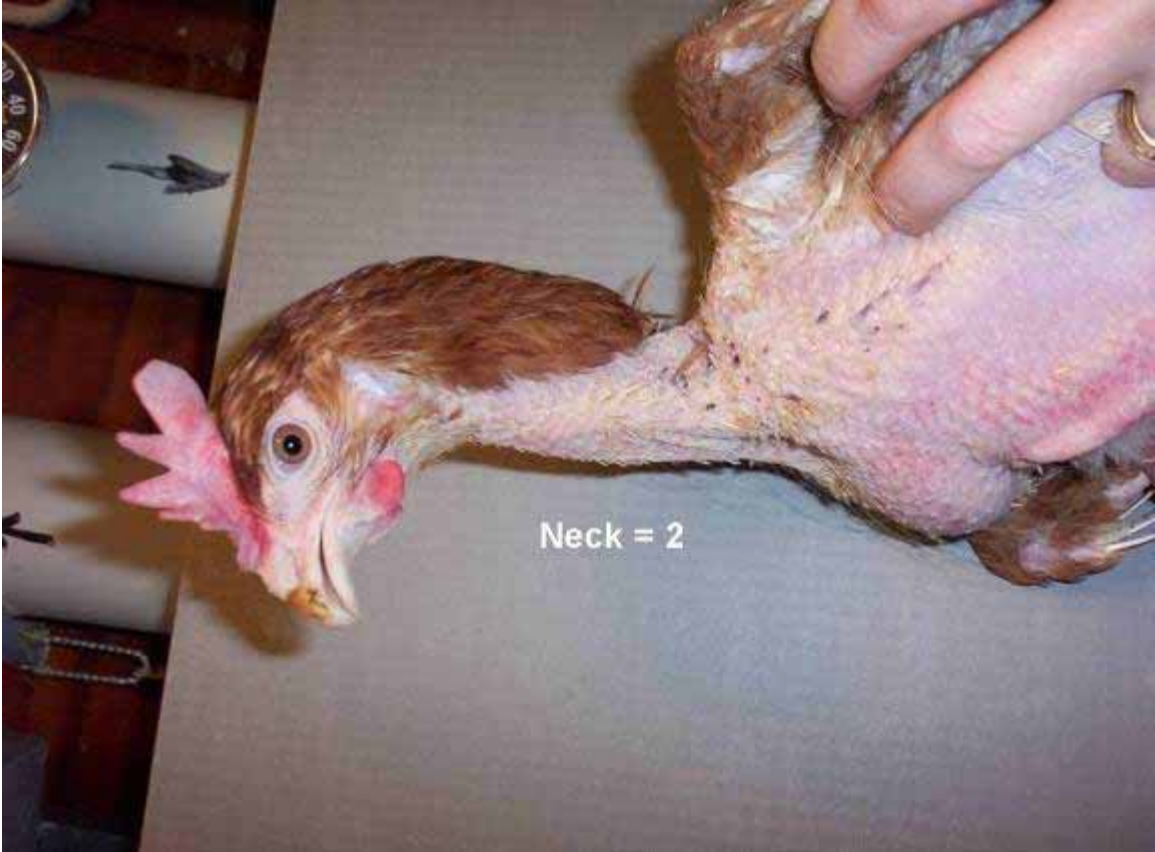
Figs. 3-4. Target bird for score 3 of neck of brown genotypes.

Neck = 3

Neck =3
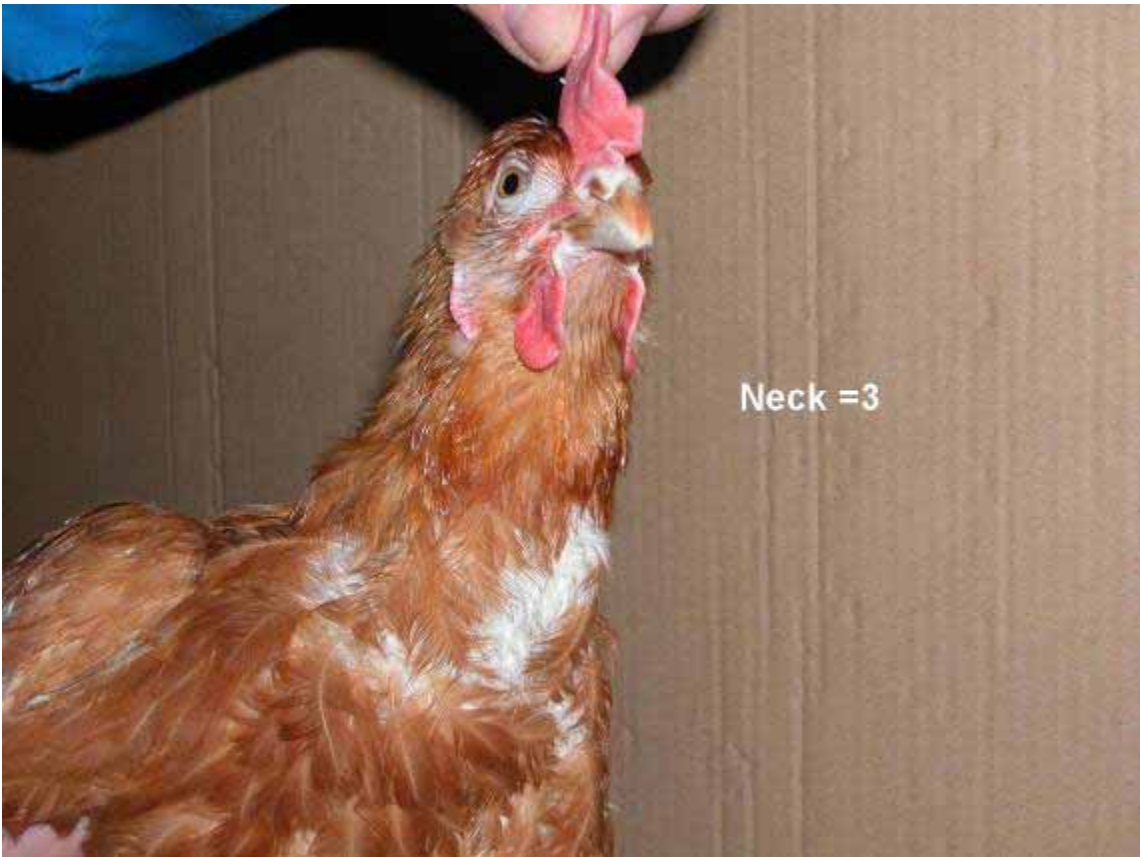
Fig. 5. Target bird for score 4 of neck of brown genotype.
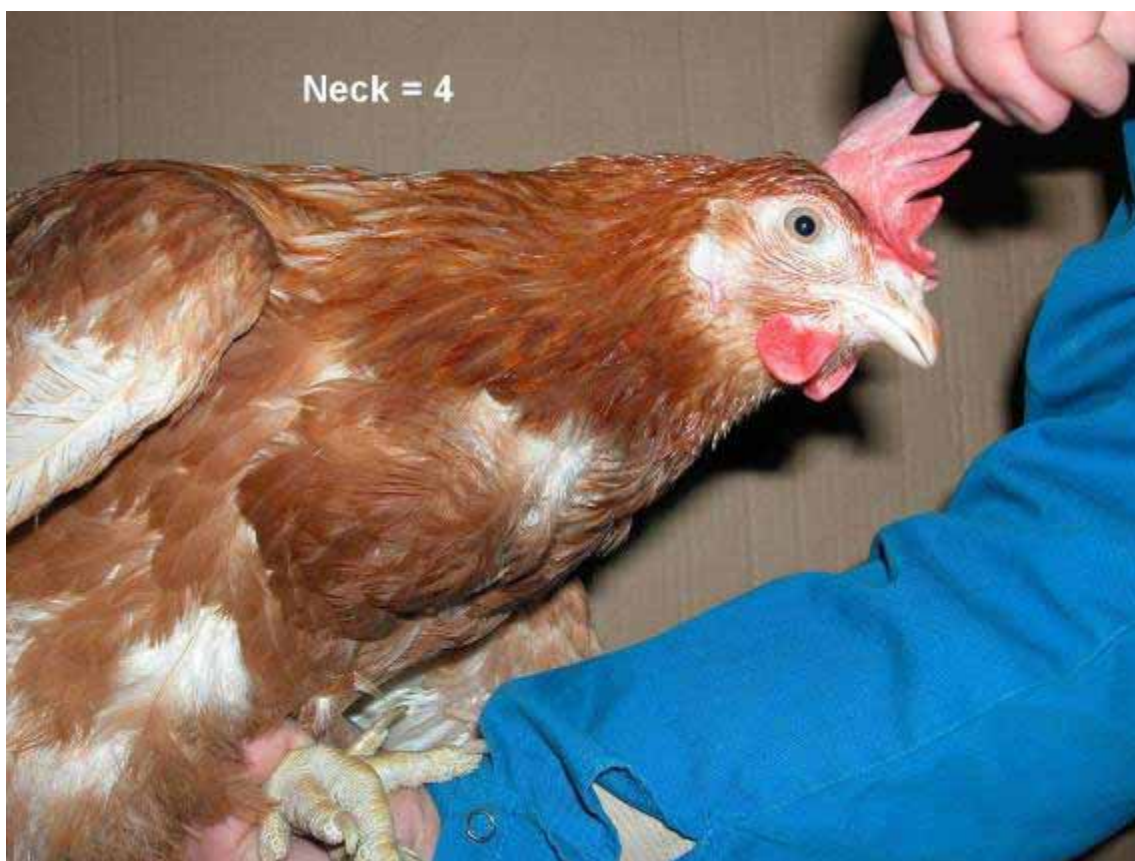
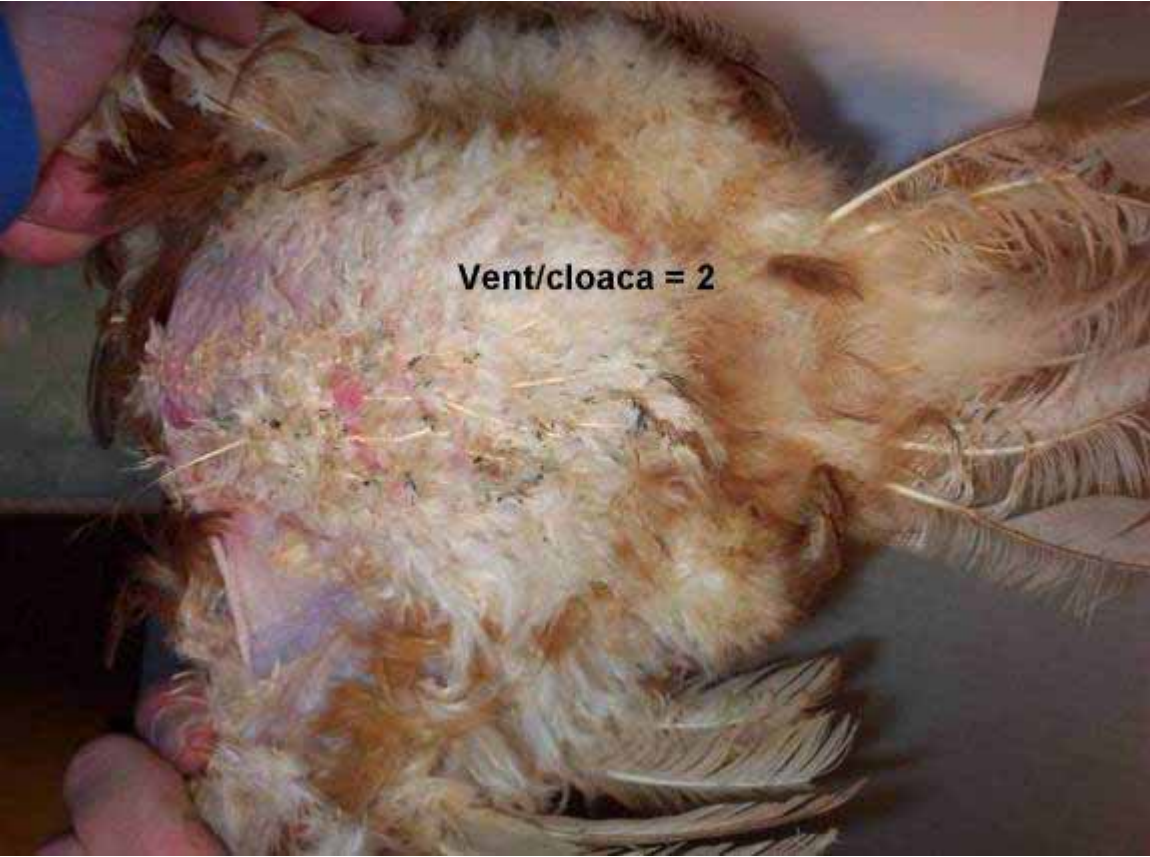Figs. 6-7. Target birds for scores 1-2 on breast of brown genotypes.
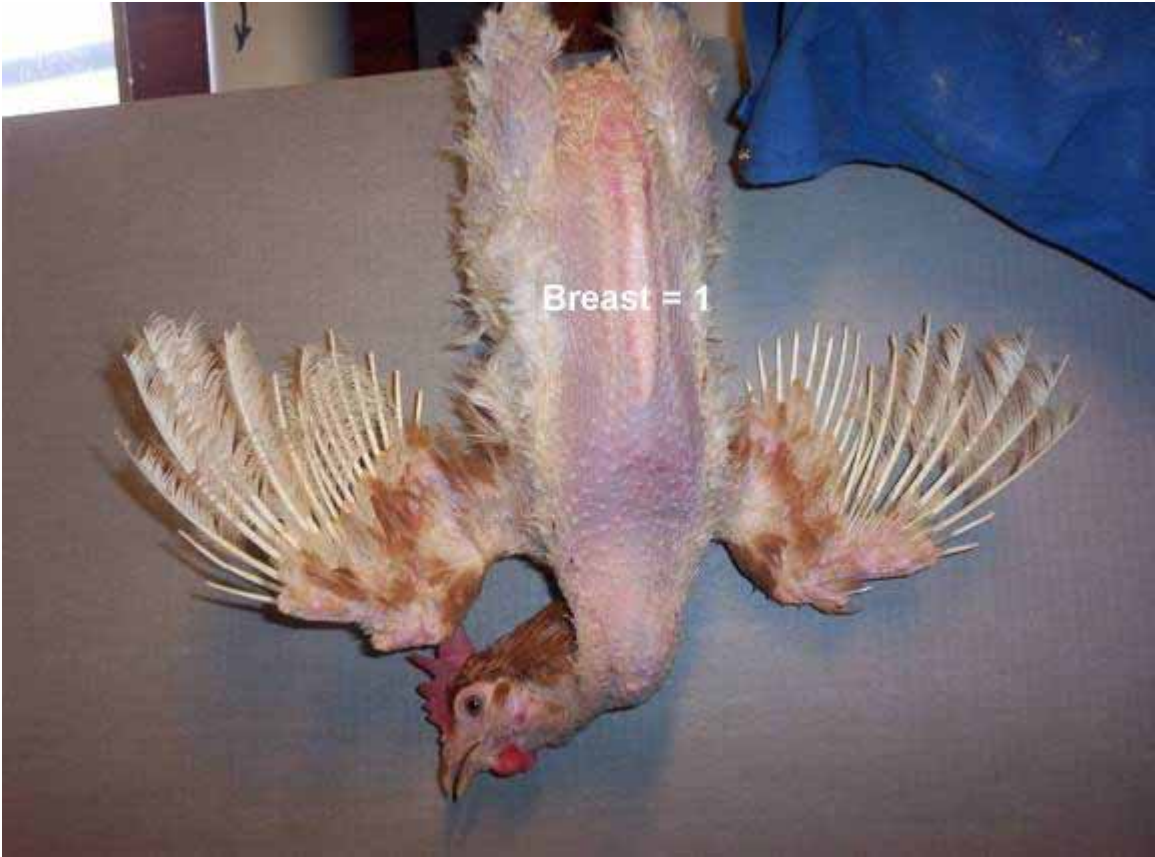
Figs. 8-9. Target birds for scores 3-4 on breast of brown genotypes.

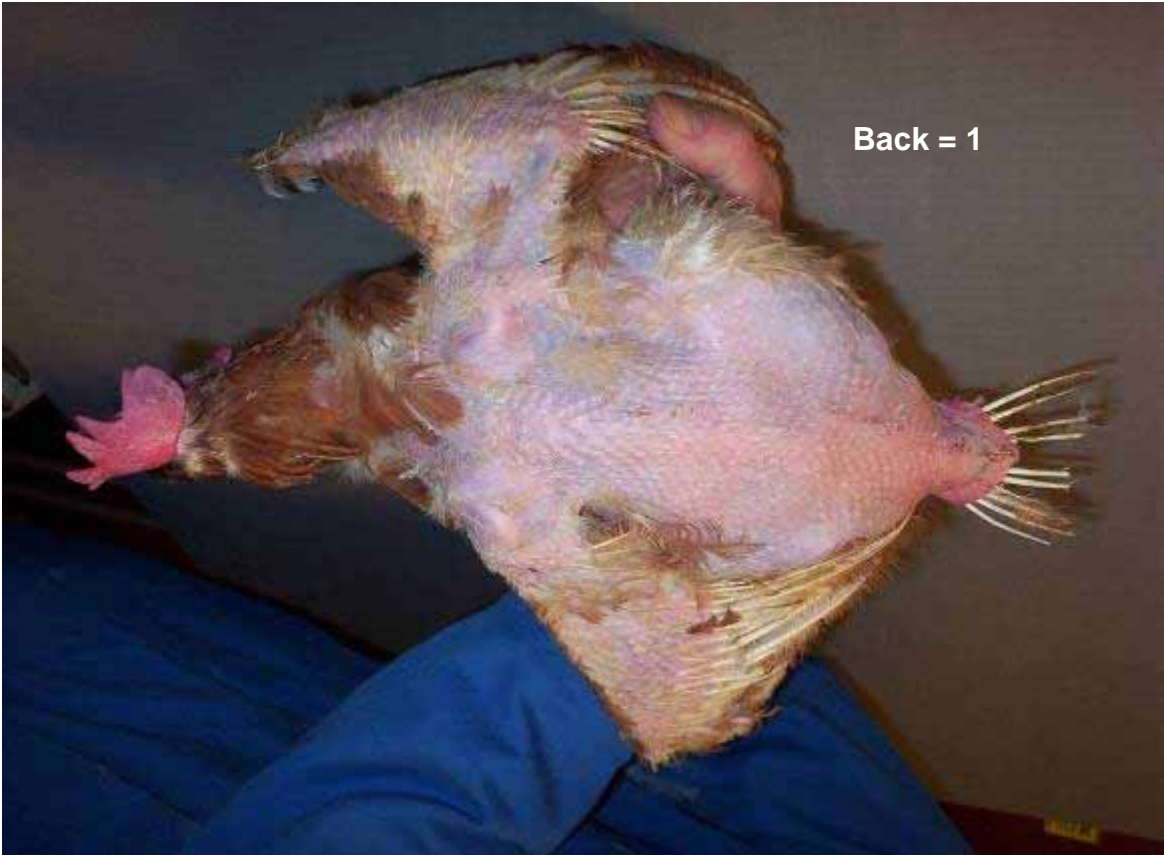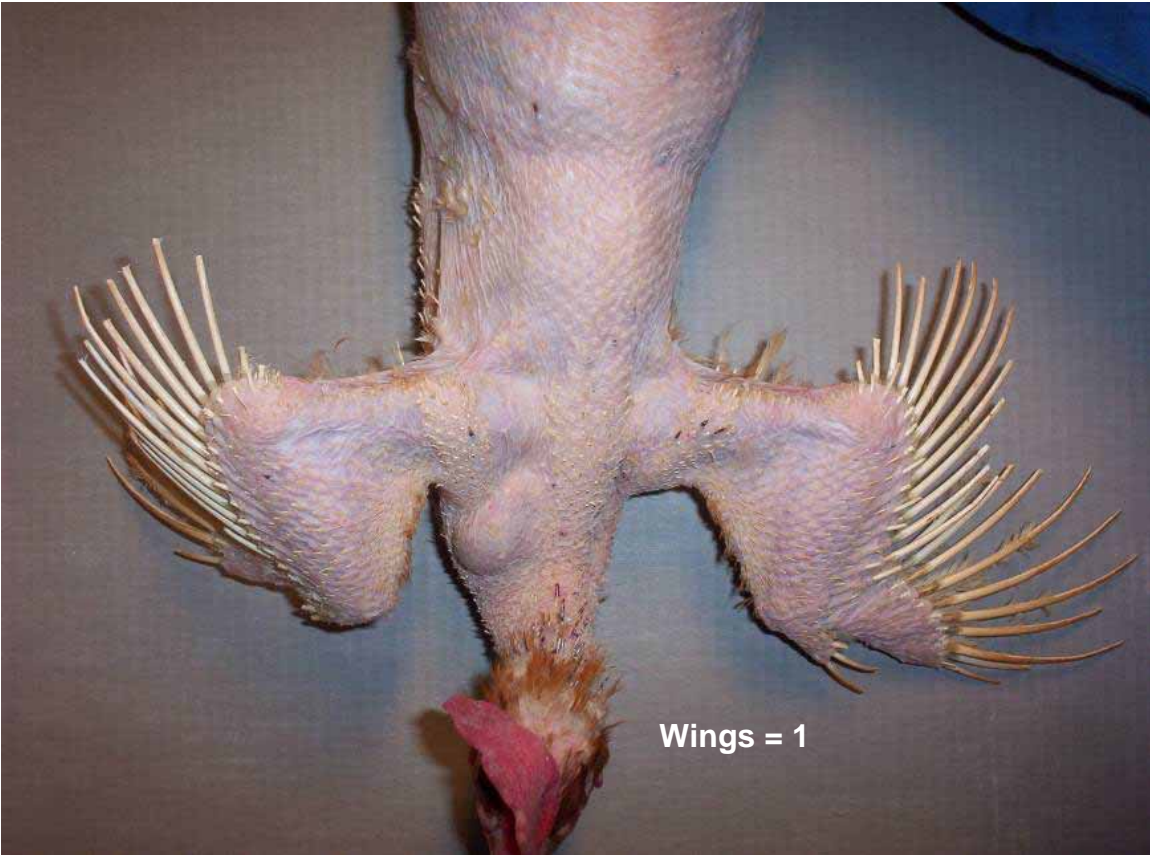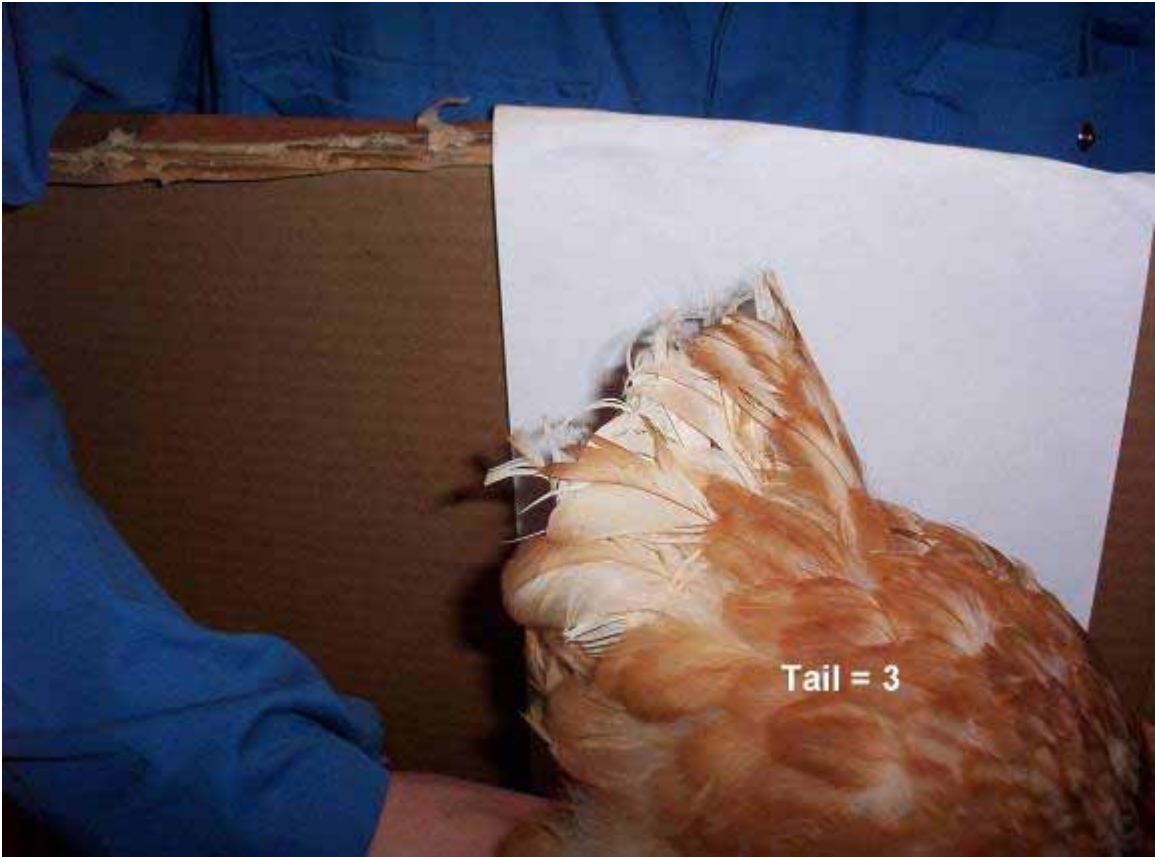Figs. 10-11. Target birds for scores of 1-2 on vent/cloaca of brown genotypes.

Figs. 12-13. Target birds for scores 3-4 on vent/cloaca of brown genotypes.

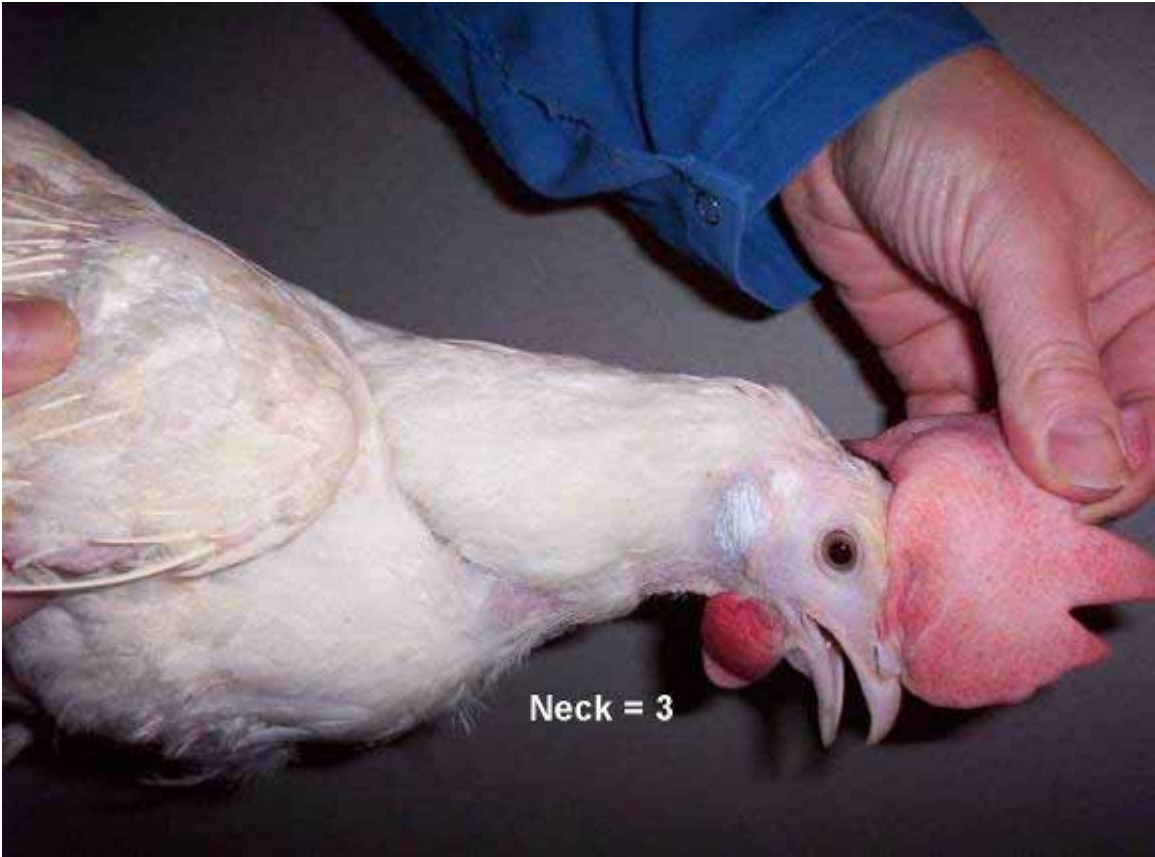Figs. 14-15. Target birds for scores 1-2 on back of brown genotypes.

Back = 1

Back = 2

Figs. 16-17. Target birds for scores 3-4 on back of brown genotypes.

Back = 3

Back = 4

Figs. 18-19. Target birds for scores 1-2 on wings of brown genotypes.

Wings = 1

Wings = 2

Figs. 20-21. Target birds for scores 3-4 on wings of brown genotypes.

Wings = 3

Wings = 4

Figs. 22-23. Target birds for scores 1-2 on tail of brown genotypes.

Figs. 24-25. Target birds for scores 3-4 on tail of brown genotypes.

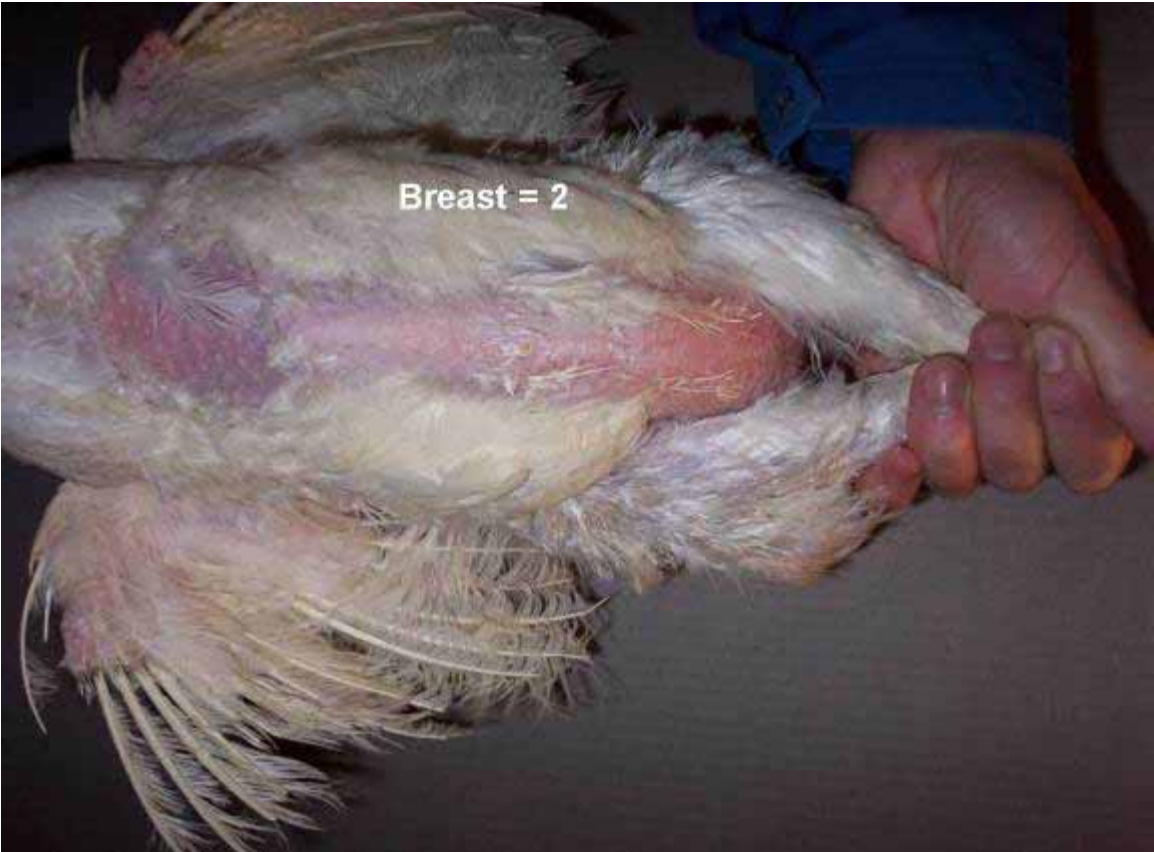Figs. 26-27. Target birds for scores 1-2 on neck of white genotypes.

Neck = 1

Neck = 2

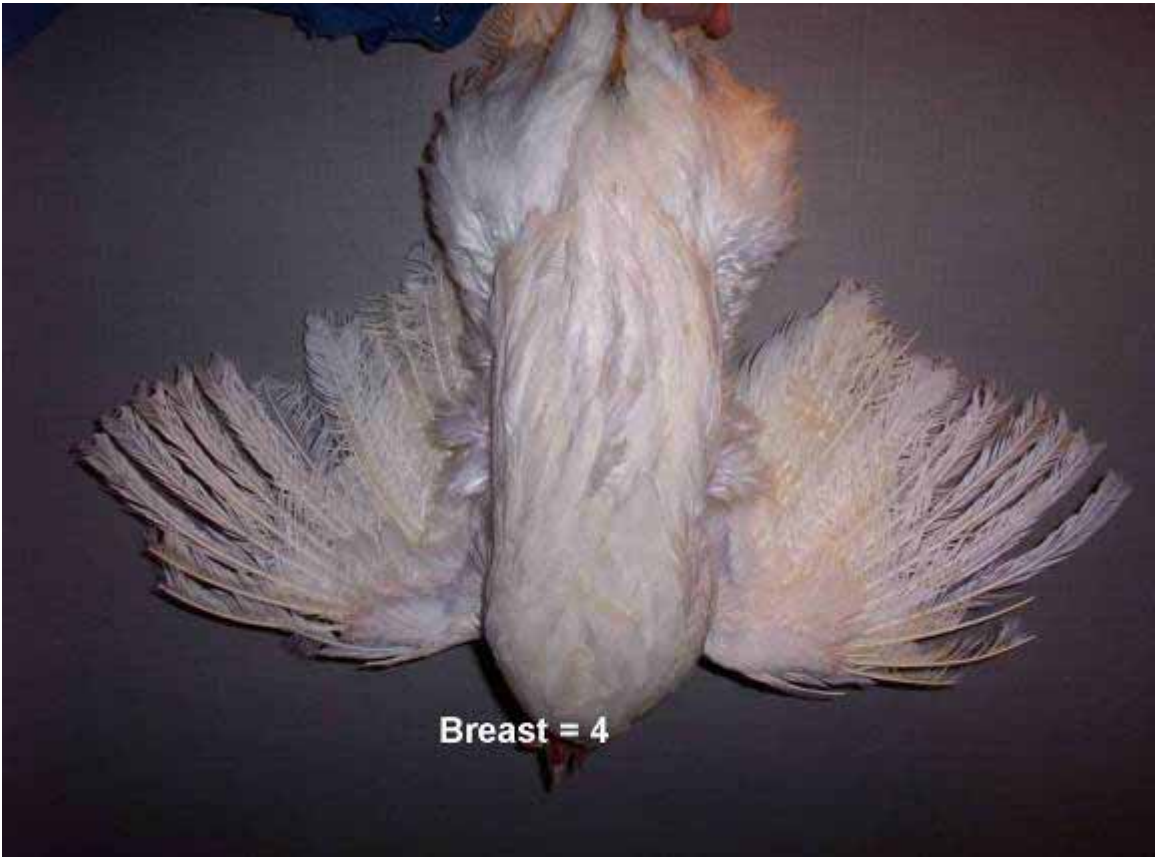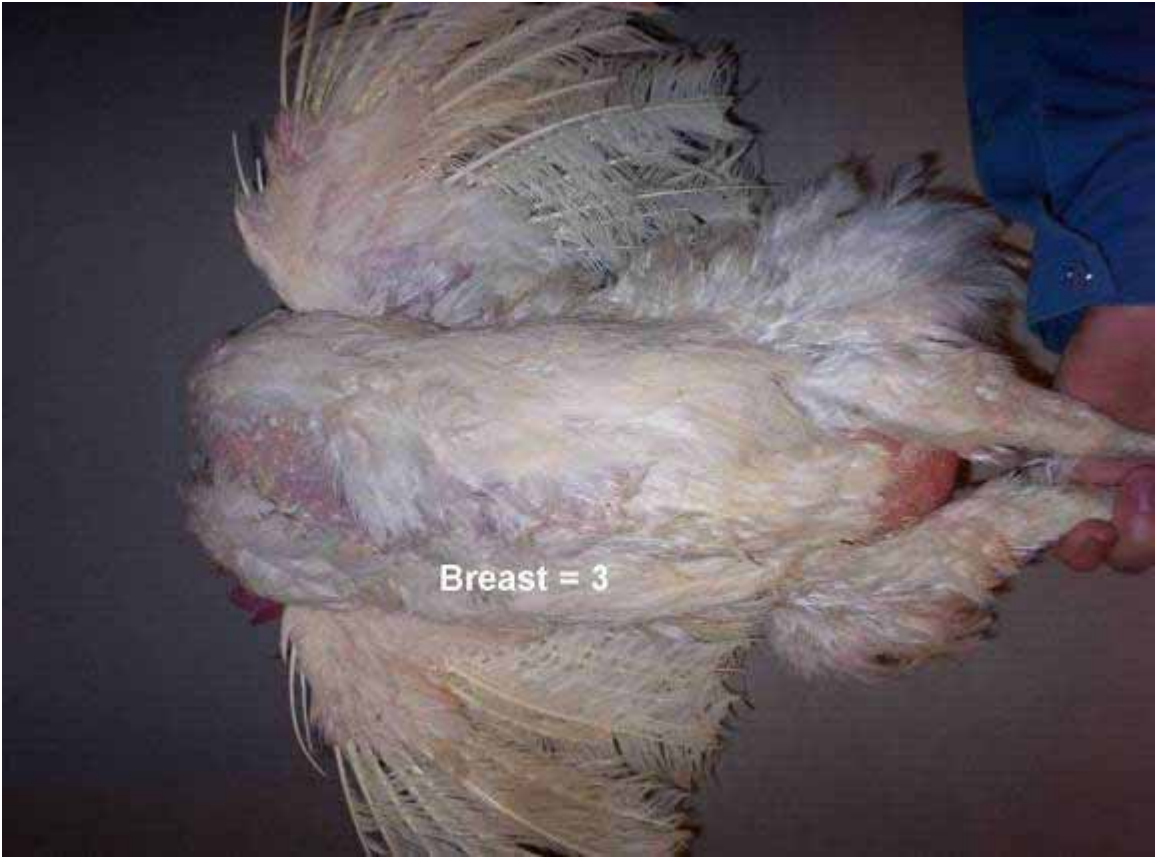Figs. 28-29. Target birds for scores of 3-4 on neck of white genotypes.

Neck = 3

Neck = 4

Figs. 30-31. Target birds for scores of 1-2 on breast of white genotypes.

Breast = 1

Breast = 2

Figs. 32-33. Target birds for scores 3-4 on breast of white genotypes.

Breast = 3

Breast = 4

Figs. 34-35. Target birds for scores 1-2 on vent/cloaca of white genotypes.

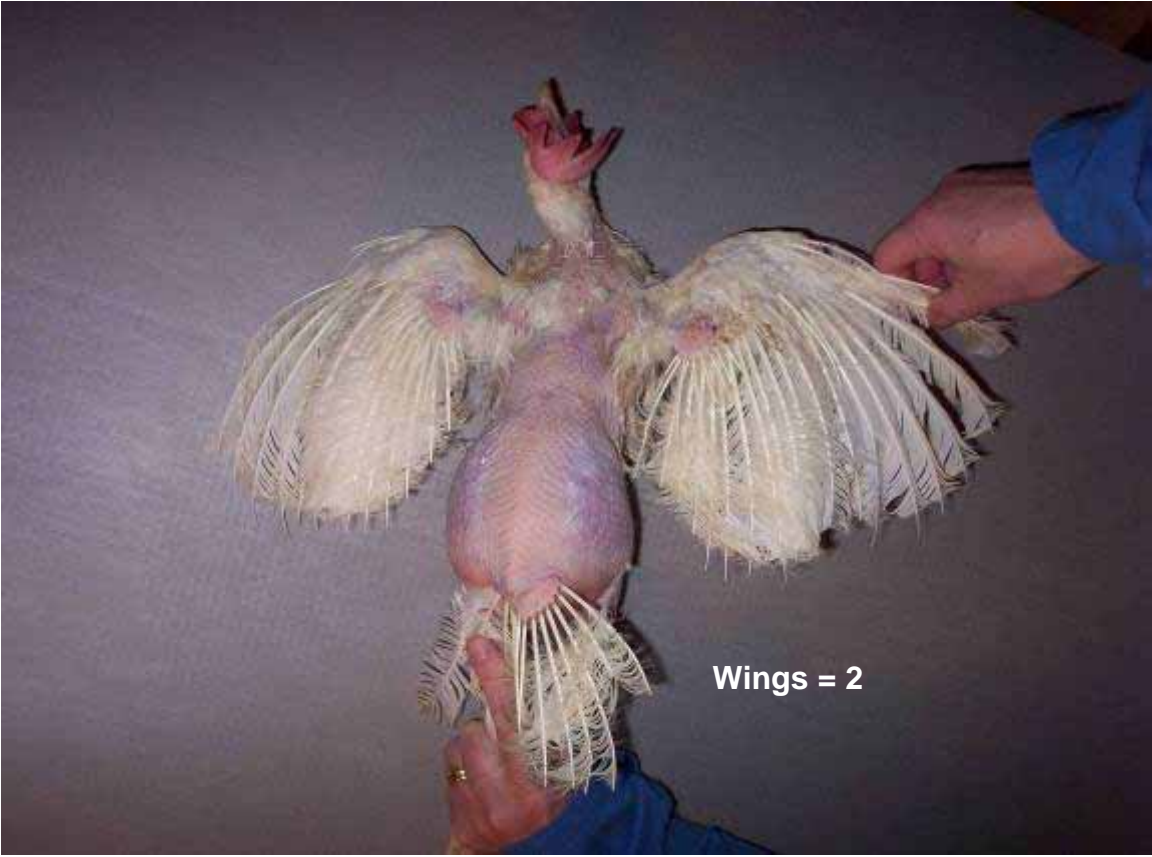Figs. 36-37. Target birds for scores 3-4 on vent/cloaca of white genotypes.
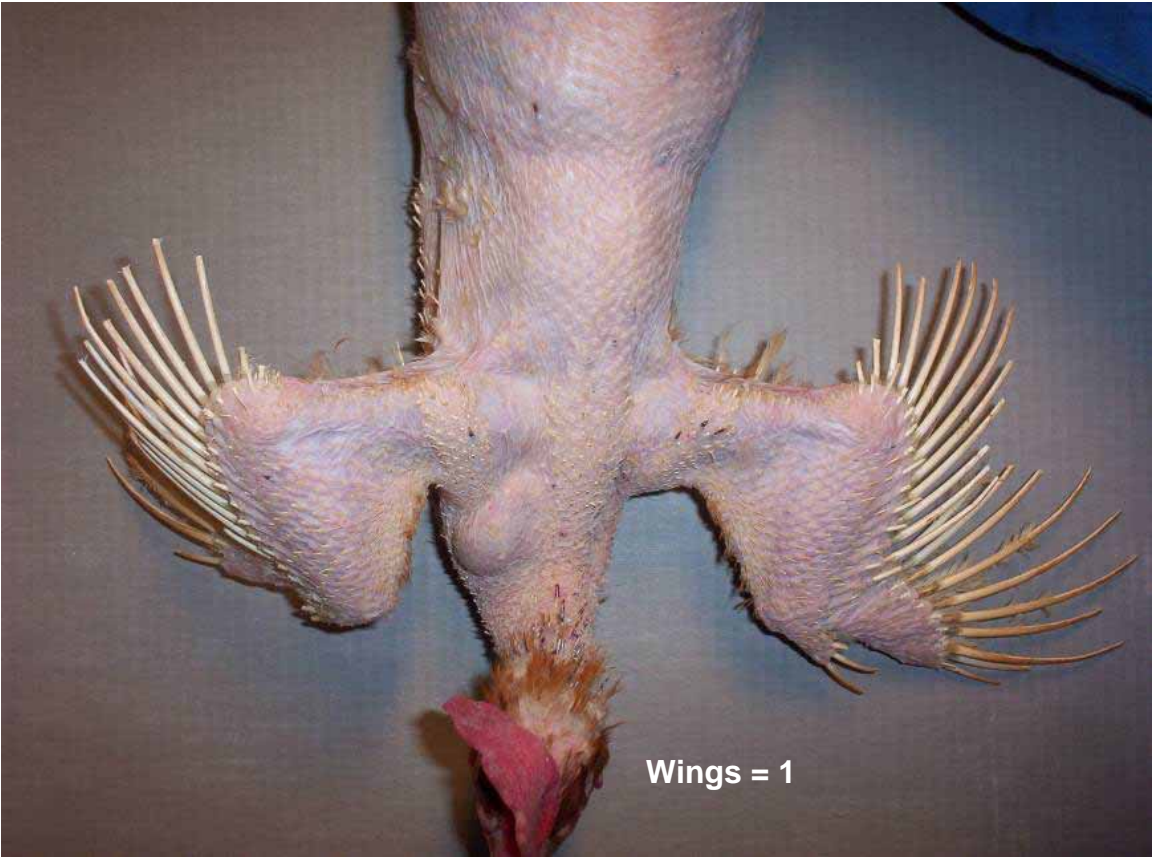
Figs. 38-39. Target birds for scores 1-2 on back of white genotypes.

Back = 1

Back = 2

Figs. 40-41. Target birds for scores 3-4 on back of white genotypes.

Back = 3

Back = 4

Figs. 42-43 Target birds for scores 1-2 on wings of white genotypes.

Figs. 44-45. Target birds for scores 3-4 on wings of white genotypes.

Wings = 3

Wings = 4

Figs. 46-47. Target birds for scores 1-2 on tail of white genotypes.

Tail = 1

Tail = 2

Figs. 48-49. Target birds for scores 3-4 on tail of white genotypes.

Figs. 50-51. Target birds of scores 1-2 for wounds on rear part of body.

Wounds on
rear part = 1

Wounds on rear part = 2

Fig. 52. Target bird for score 3 for wounds on rear part of body.

Wounds on rear part = 3

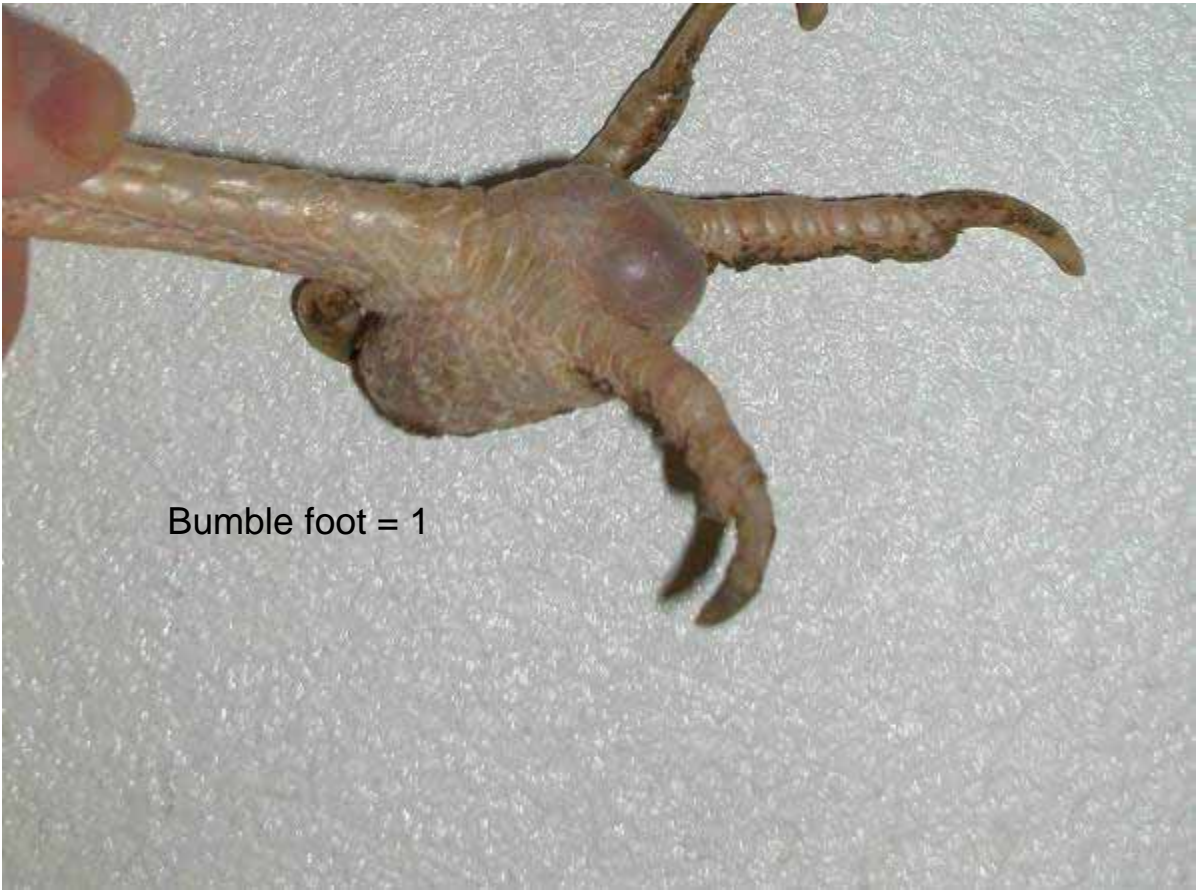Figs. 53-54. Target birds for score 1-2 for wounds on comb.
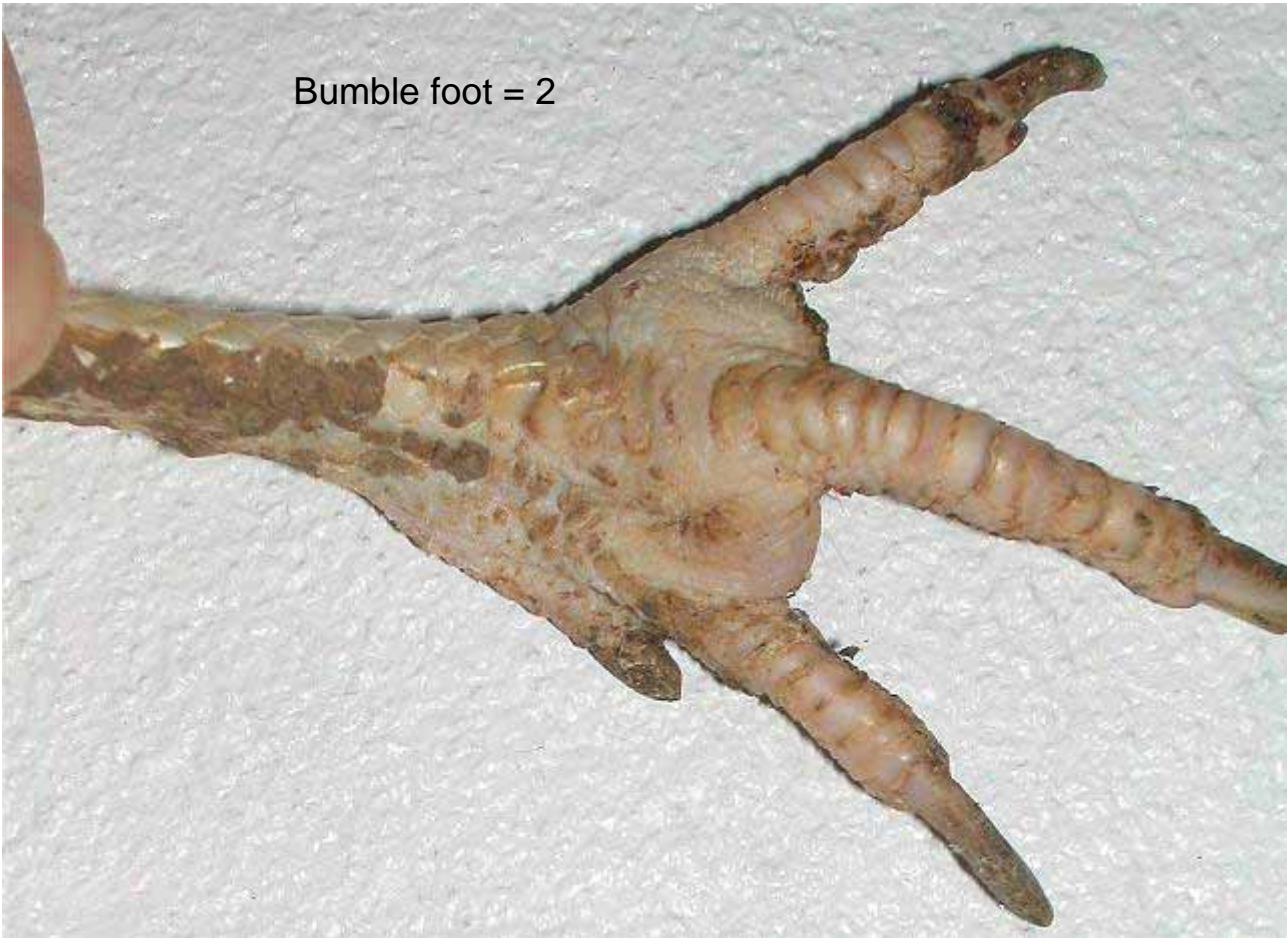

Wounds on comb = 1

Wounds on comb = 2

Fig. 55. Target bird for score 3 for wounds on comb.

Wounds on comb = 3

Figs. 56-57. Target bird for score 1 for bumble foot syndrome.

Bumble foot = 1

Bumble foot = 1

Figs. 58-59. Target bird for score 2 for bumble foot syndrome.

Bumble foot = 2

Bumble foot = 2

Figs. 60-61. Target bird for score 3 for bumble foot syndrome.

Bumble foot = 3

Bumble foot = 3