



## Global Animal Partnership's Better Chicken Project: Broiler Chicken Assessment Protocol v1.0

### **About Global Animal Partnership (G.A.P.):**

Global Animal Partnership (G.A.P) is one of the largest, and most respected animal welfare standards and labeling organizations in North America. Established in 2008, G.A.P. impacts the welfare of over 416 million animals each year through third-party certification of more than 3,900 farms. G.A.P. believes that meaningful label claims, validated by third-party audits on every farm, are key to influencing the industry, raising consumer expectations, and creating long-lasting change for farm animals. For more information, please visit [www.globalanimalpartnership.org](http://www.globalanimalpartnership.org) or contact us at [info@globalanimalpartnership.org](mailto:info@globalanimalpartnership.org).

### **Background:**

Modern broiler chickens have been genetically selected for their efficient growth and higher breast meat yield. However, this has given rise to concerns about broiler chicken welfare. As a first step in addressing the issue, G.A.P. provided funding to the University of Guelph to complete the first multi-disciplinary study to evaluate broiler chicken health, welfare, behavior, meat quality and production across 16 different strains. That research-based framework was critical to G.A.P.'s Better Chicken Project and has helped form the basis for scientific evaluation of welfare attributes for broiler breeds. As a second step, the assessment protocol detailed in this document will be used to determine breed eligibility for G.A.P.'s 5-Step® Animal Welfare Program for Meat Chickens v4.0 with the goal of improving chicken welfare.

G.A.P. would like to acknowledge and thank additional funding secured by the researchers to complete the study: Canada First Research Excellence Fund; in-kind contributions provided by Ontario Agri-Food Innovation Alliance and major poultry genetics companies.

The study was designed and conducted independently at the University of Guelph – a summary of the study can be found at <https://globalanimalpartnership.org/better-chicken-project>.

### **Members of the Technical Working Group:**

G.A.P. would also like to acknowledge and thank the 12 members of the multi-stakeholder Technical Working Group (including breed companies, producers, scientists, and animal advocates) for their time and contributions with this process.

### **A Note About this Document:**

This document is the assessment protocol only. An approved breeds list for G.A.P.'s 5-Step® Animal Welfare Program for Meat Chickens will continue to be communicated in Appendix I of the G.A.P. standard and on our website at [www.globalanimalpartnership.org/standards/chickens](http://www.globalanimalpartnership.org/standards/chickens). Determinants of eligibility for the G.A.P. Program using this protocol will be available in **v4.0** of G.A.P.'s 5-Step® Animal Welfare Program for Meat Chickens. Please note, G.A.P. is not expecting farms to conduct this protocol – this protocol is specifically to be conducted by a G.A.P. accredited research facility.

## Breed Assessment Protocol v1.0

The following protocol details the requirements for conducting the assessment of broiler chicken breeds seeking an eligibility determination for use in G.A.P.'s 5-Step® Animal Welfare Program for Meat Chickens v4.0. This protocol is to be followed in its entirety. Any deviation from the protocol must be approved by G.A.P.

### SECTION 1: GENERAL

#### 1.1 Protocol Objectives

- 1.1.1 Create a repeatable, standardized protocol for hatching, rearing, and measuring the assessment criteria of broiler chickens detailed in Section 4 on two (2) chicken breeds – a control bird (see Section 2.2 below) and a test bird.
- 1.2.1 The results will be used by G.A.P. to evaluate and decide eligibility for the test breed.

### SECTION 2: TRIAL SET UP

#### 2.1 Assessment Facilities

- 2.1.1 Only G.A.P. accredited facilities may be used to conduct this protocol.
- 2.1.2 All facilities must have this protocol pre-approved by the research and/or university Animal Care and Use Committee in accordance with guidelines outlined by the regulatory body for the country in question (e.g., Canadian Council for Animal Care, American Association for Laboratory Animal Science, etc.).
- 2.1.3 Facilities seeking G.A.P. accreditation can contact G.A.P. at [info@globalanimalpartnership.org](mailto:info@globalanimalpartnership.org) to request a pre-screening application, or complete the document online at [www.globalanimalpartnership.org](http://www.globalanimalpartnership.org).
- 2.1.4 Facilities will be accredited for three (3) years with an option to extend (see G.A.P. Facility Accreditation Program for further details).
- 2.1.5 The decision to accredit a facility will be based on a review of the Principal Investigator's (PI) team, background and experience, the facilities available, and ability to conduct the protocol in its entirety.
- 2.1.6 Facilities are required to follow G.A.P.'s data management, retention, and reporting requirements as specified in G.A.P.'s Facility Accreditation Program.

## 2.2 Control Birds

① *G.A.P. chose to use a conventional hybrid as the control bird for this version of the protocol due to expected availability of this hybrid throughout North America where trials will likely be conducted. The control bird is used to ensure that trial conditions are appropriate and as expected per the protocol – the control bird is not currently approved as a G.A.P. broiler breed for G.A.P.'s Animal Welfare Standards for Broiler Chickens Raised for Meat v4.0.*

- 2.2.1 The offspring of a Ross 708 female crossed with a Ross 344 male must be used as the Control bird in all trials.
- 2.2.2 Breeding companies will supply current expected growth and feed consumption values for pen trials to the PI and G.A.P. prior to each trial. Large variation (which for this protocol is defined as +/- 10-15% variation from the expected pen trial data provided by the breeding company(ies)) from those figures for the Control bird may be an indicator that a trial needs to be re-run and will trigger further analysis.
- 2.2.3 Control birds will be scored for foot pad dermatitis according to the protocol in Appendix I. Data from the Control bird will be used to assess the management of the pen environment if further analysis of the environmental management of the pens and trial rooms is required.

## 2.3 Test Birds

- 2.3.1 All involved with testing, analysis, and determination of eligibility will remain blind to the breed of the Test bird (i.e., breed and parent stock are not to be identified) throughout the duration of the protocol and analysis.
- 2.3.2 Only birds that receive a passing score (see 6.1.1.) will be identified.

## 2.4 Parent Flocks

① *The requirements detailed in this protocol do not supersede the Assessment Facility's requirements around breeder health status, health certificates and related protocols.*

- 2.4.1 The parent flock age for both the Test and Control bird must be between 35 and 50 weeks of age. The age of both breeder flocks must be recorded and communicated to the PI.
- 2.4.2 There must be no more than +/-5 weeks of age difference between the parent flock age for both the test and control birds.
- 2.4.3 All eggs must be date stamped with the date of lay. Country of origin of the eggs must be declared.
- 2.4.4 Breeder flocks must report if spiking was used. Only males of the same breed as the original breeder flock may be used to spike the flock.

## 2.5 Hatching

- 2.5.1 Ideally the hatchery will be on the same site as the Accredited Facility and managed by the PI's team. If this is not possible, any off-site hatchery must have oversight from the PI's team to ensure the requirements of this protocol are met.
- 2.5.2 The Control and Test birds must be hatched at the same hatchery so that management protocols are the same for all birds.
- 2.5.3 Setters and hatchers should be set to the breeders' recommended temperature and humidity specifications.
- 2.5.4 All eggs must be less than 8 days old prior to setting.
- 2.5.5 All chicks must be evaluated using the Tona Score (Tona et al., 2003) at the hatchery. Only chicks scoring 100 on the Tona Score can be placed within the trial.  
① The number of eggs set should factor in chick quality, fertility, and other related factors to ensure 50 high quality chicks are placed in each pen.
- 2.5.6 All chicks must be vaccinated at the hatchery for Marek's, Newcastle disease, and Infectious Bursal Disease (IBD), Infectious Bronchitis, and Coccivac-B (or Paracox-5).
- 2.5.7 All chicks must be individually weighed at the hatchery prior to placement in chick transport boxes.
- 2.5.8 All chicks must be placed within 12 hours of removal from the hatcher, including if an off-site hatchery is used. Chicks must be transported in chick transport boxes with chick paper (liner) in the bottom of each box, and 100 chicks per transport box.
- 2.5.9 Transport of chicks must follow the Breeding company's management handbook recommendations for temperature, relative humidity, and air flow.

## 2.6 House/Room and Pen Set up

- 2.6.1 Two (2) trials must be completed to assess a breed. Trials may be run concurrently, staggered or sequentially (no more than 8 weeks apart if run sequentially). Test birds and Control birds must be run at the same time, and where possible, in the same building.
- 2.6.2 Each trial must have four (4) separate pens per breed with eight (8) pens per breed across the two trials. If the PI has concerns around any of the results and thinks further trials may be required, the PI must contact G.A.P. prior to commencing with additional trials. No data, including additional trials, can be included, or discarded from the analysis without prior written approval from G.A.P.

- 2.6.3 Each pen must hold 50 birds, as hatched (i.e., mixed sex) at a stocking density of 6 lbs/ft<sup>2</sup> (29 kg/m<sup>2</sup>). This means that the floor plan must provide 56 ft<sup>2</sup> (5.2 m<sup>2</sup>) for each pen (calculated assuming 10 birds will be withdrawn from each pen at 5.5 lbs (2.5kg) to collect carcass quality data with the balance growing to 7.0 lbs (3.2 kg) or 84 days).
- 2.6.4 Pens must be blocked within a room according to the statistical design to account for any known variation in environmental parameters, such as temperature, light level, air flow and humidity, between pens. Breeds must be placed into pens randomised within each block. If more than one room is used, then each room must include equal pens of Control and Test birds.
- 2.6.5 Pens must be of equal size.
- 2.6.6 Pens must not have solid sides, so that air flow is not restricted in any way.
- 2.6.7 Pens must be at least 4 feet tall to prevent birds from flying out of the pen.
- 2.6.8 Pen floors must be solid and covered with 3 inches (7.6cm) of wood shavings or rice hulls. Whichever flooring substrate is used, it must be used in all 16 pens across the two trials.
- 2.6.9 Pens must be cleaned out completely between replicates and trials and disinfected to minimize any transmission of disease.
- 2.6.10 Facilities must follow the recommended temperature and humidity values specified in Table 1 (Source: Ross Broiler Management Handbook 2018). If brooding systems other than spot brooding are used, such as under-floor heating systems, please contact G.A.P. for further guidance.

**Table 1:** Broiler house temperatures. The temperatures indicated are based on a relative humidity (RH) value between 60-70% up to 3 days of age, and a RH value of 50% thereafter. (Source: Ross Broiler Management Handbook 2018, adapted).

Age (Days)	Whole-House Brooding Temperature °C (°F)	Spot Brooding Temperature at Outside Edge of Brooder
Day-old	30 (86)	32 (90)
3	28 (82)	30 (86)
6	27 (81)	28 (82)
9	26 (79)	27 (81)
12	25 (77)	26 (79)
15	24 (75)	25 (77)
18	23 (73)	24 (75)

21	22 (72)	23 (73)
24	21 (70)	21 (70)
27+	20 (68)	20 (68)

① The recommended values above should not restrict the facility from adjusting temperatures based on bird behavior.

- 2.6.11 Room temperature, relative humidity and ventilation rates must be recorded twice daily for each room used in the trial measured at bird level. Recording of these measures must be done at the same time each day (within the same hour).
- 2.6.12 Water must be supplied via nipple drinkers according to the manufacturer's recommendations.
- 2.6.13 Each pen must be equipped with 1 straw bale (minimum size of 2.5 feet x 1.5 feet (76cm x 46cm) at day 7. Bales must be replaced as soon as the birds destroy 50% of the bale. Bale strings must be left intact.
- 2.6.14 Each pen must provide 2 perches per pen measuring 48 inches (122 cm) in length, placed at day 7. Perches must be 4 inches (10 cm) off the ground for the first 28 days of life and 6 inches (15 cm) off the ground 29 days of age until the end of the trial. Perches must be situated such that the length of the perch is distanced at least 10 inches (25 cm) from the pen wall and from the other perch. Perches must be at least 2 inches (5cm), but no more than 3 inches (7.6 cm) in diameter. Perches must not have right-angled edges (edges must be rounded off), must be stable to adequately support broiler weight, and must be securely placed in the pen to prevent the perch from tipping over or being knocked over.
- 2.6.15 The light level, supplied by artificial lighting, in each pen must be at least 20 lux at bird level throughout the pens.
- 2.6.16 Birds must have at least 6 hours continuous darkness (<1 lux) in every 24-hour period from 3 days after placement.
- 2.6.17 The dark period must commence at the same time each day and take place during the natural period of darkness.
- 2.6.18 The drinker, feeder, perch and straw bale used within each pen must be of the same design and colour and occupy the same position within each of the pens.

## 2.7 Feed and Water

- 2.7.1 All birds must have continuous access to fresh, clean water.

2.7.2 The same feed must be fed to all birds undergoing the trial and meet the levels specified in Table 2.

**Table 2:** Diet Specifications

<b>Analysed nutrient content</b>		<b>Starter</b> (0-10 days)	<b>Grower</b> (11-28 days)	<b>Finisher</b> (29- slaughter)
Metabolizable Energy	kcal/kg	3000	3120	3176
Crude Protein*	%	22	21.3	18.3
Digestible Lysine (minimum)	%	1.22	1.15	1.01
Digestible Methionine + Cysteine (minimum)	%	0.93	0.87	0.82
Calcium	%	0.90	0.85	0.78
Available Phosphorus	%	0.45	0.43	0.39
Sodium	%	0.16 – 0.22	0.16 – 0.22	0.16 – 0.22
Chloride	%	0.16 – 0.24	0.16 – 0.24	0.16 – 0.24
Potassium	%	0.50 – 0.90	0.60 – 0.90	0.60 – 0.90

\* Crude Protein level shown is a guide value providing minimum amino acids are respected.

2.7.3 The diet must be an all-vegetarian diet free from mammalian, avian, fish and/or fish by-products.

2.7.4 The diet must meet be free of antibiotics, ionophores, beta agonists, and/or sulfa drugs.

ⓘ A non-antibiotic chemical coccidostat product may be fed in the feed as long as it is provided to both the Control and Test breeds.

2.7.5 The Starter diet must be fed in a crumbled form. Grower and Finisher rations can be fed as pellets.

2.7.7 All birds are to be fed *ad libitum*.

- 2.7.8 A feed sample of each diet (minimum of 300 g sample), as well as the corresponding raw feed ingredient samples (minimum of 100 g sample) for each diet must be obtained from the feed mill for each production lot. Samples are to be provided in sealed bags where excess air has been removed, and stored in a cool, dry and dark environment so that sample quality is maintained and preserved.

Bags must be labelled with:

- i) date sampled;
- ii) feed Mill/Manufacturer name;
- iii) diet type (e.g., starter, grower, finisher);
- iv) ingredient and diet raw ingredient is used in;
- v) weight; and
- vi) reference ID.

Feed samples will only be analysed if there are any concerns with the ration.

## SECTION 3: PEN/ROOM/HOUSE MANAGEMENT

### 3.1 Litter

- 3.1.1 Litter moisture must be assessed and recorded daily (see Appendix II). Results must be recorded at the same time each day.
- 3.1.2 Wood shavings OR rice hulls must be replenished as necessary to ensure litter quality is maintained as dry and friable throughout the duration of the trial. Note, other bedding materials are not accepted for the trial.
- ① If Control OR Test pens require additional shavings or rice hulls be added to their pens to maintain litter quality, then an equal amount of shavings or hulls must be added to the same number of Control OR Test pens so that any treatment effect can be accounted for.
- 3.1.3 Records of amounts of wood shavings or rice hulls used to replenish pens must be kept.

### 3.2 Ventilation

- 3.2.1 Room ventilation must be managed to ensure that all birds, at all times, have good air quality and are kept thermally comfortable (see 2.5.10). Where possible, continuous carbon dioxide and ammonia monitoring should be used to evaluate air renewal rate.

Specifically, at bird level:

- i) carbon dioxide must not exceed 3,000 ppm; and
- ii) ammonia must not exceed 10 ppm.



### 3.3 Daily Inspections

3.3.1 Each pen and all birds must be inspected at least twice daily.

### 3.4 Culling

3.4.1 Any birds meeting the following criteria must be culled according to acceptable euthanasia methods (see Appendix III). The reason for culling\* must be recorded.

Criteria:

- i) runts;
- ii) any bird exhibiting a lameness score of 2 (see Appendix IV);
- iii) any bird with a foot pad dermatitis score of 2 (see Appendix I);
- iv) any bird with a hock burn score of 4 or 5 (see Appendix VII);
- v) any sick or injured bird without chance for recovery (for example sick or injured such that the chicken is unable to reach food and water); and/or
- vi) any bird injured by accident (for example, a bird that gets trapped under equipment and is injured; or is accidentally stepped on; etc. These birds will be excluded from any analysis.)

### 3.5 Weights

3.5.1 Control and Test birds will be grown to two target weights, where specific measures (see Table 3) will be collected. Target weight 1 (TW1) will be when the average weight of all 4 pens per breed reaches an average target weight of 5.5 lbs (2.5kg) (TW1). The remaining birds grown to an average final target weight of 7.0 lbs (3.2 kg), or to a maximum of 84 days (TW2) for breeds that may never grow that heavy. Facilities will need to collect data on the Control birds independent of the Test birds based on the average of the 4 pen weights for each. In other words, Control birds and Test birds may not be the same age at TW1, and similarly, may not be the same age at TW2.

## SECTION 4: MEASURES AND ASSESSMENTS

### 4.1 Measures

4.1.1 The measures in Table 3 will be collected throughout the trial as indicated and used to determine eligibility of the Test bird (see Section 6).

4.1.2 Results will be accepted in metric or U.S. customary/imperial measurements as long as the system used is consistent for all measures within the trial.

**Table 3:** Measures collected during the protocol (sex to be recorded as part of measurements where noted)

Type	Variable	Sample Size: Test Bird	Sample Size: Control Bird	Measuring and Directions
Behavior	Enrichment use	Whole pen (count)	n/a	<p>Scan sample every 15 minutes beginning when lights go on and ending when lights go off to count the number of birds on top of the straw bale. Measurements commence on day 7 and continue every 7th day thereafter until the end of the trial (i.e., day 7, day 14, day 21, day 28 etc.).</p> <p>Data will be summarized as follows to determine the final average for TW1 and TW2:</p> <ol style="list-style-type: none"> <li>1) Each time point per pen on the measurement day will be converted to a percent (based on the number of birds on the bale divided by the total number of birds at that measurement time point).</li> <li>2) Each time point will be averaged across the day per pen.</li> <li>3) The average per pen over the X number of days for each TW will be determined by grouping the enrichment use data together to correspond with the average age the Test Bird reaches TW1 and TW2.</li> <li>4) This will then be averaged across pens per trial, and then averaged across the two trials to determine the final average for TW1 and TW2.</li> </ol> <p>(e.g., the Test bird reaches 5 lbs. at 40 days of age, and 7 lbs. at 59 days. TW1 use of enrichments will be determined by summarizing the data across pens and trials for day 7, 14, 21, 28 and 35. TW2 use of</p>

				enrichments will be determined by summarizing the data across pens and trials for days 42, 49, and 56 days.)
	Obstacle test	10 birds/pen (5 male + 5 female)	n/a	Mobility impairment at TW1 and TW2 (as described in Caplen et al. (2014)).  Data will be summarized as detailed above in Enrichment use.
	Perch use	Whole pen (count)	n/a	Scan sample every 15 minutes beginning when lights go on and ending when lights go off to count the number of birds on top off the perch. Measurements commence on day 7 and continue every 7th day thereafter until the end of the trial (i.e., day 7, day 14, day 21, day 28 etc.)  Data will be summarized as detailed above in Enrichment use.
Carcass Quality	Wooden breast	10 birds/pen (5 male + 5 female)	n/a	Muscle myopathy at TW1 (see Appendix V).
		10 birds/pen (5 male + 5 female)	n/a	Muscle myopathy at TW2 (see Appendix V).
	White striping	10 birds/pen (5 male + 5 female))	n/a	Muscle myopathy at TW1 (see Appendix V).
		10 birds/pen (5 male + 5 female)	n/a	Muscle myopathy at TW2 (see Appendix V).
Health	Mortality	Whole pen (count)	Whole pen (count)	Measuring the number of birds that died. When mortality occurs, the following records must be kept: <ul style="list-style-type: none"> <li>i) number of birds;</li> <li>ii) date; and</li> <li>iii) reason, if easily diagnosed.</li> </ul> Data will be further summarized as follows: <ul style="list-style-type: none"> <li>i) day 1 – 7;</li> <li>ii) day 8 – TW1; and</li> <li>iii) day after TW1 – end of trial).</li> </ul>

	Culling	Whole pen (count)	Whole pen (count)	<p>Measuring overall thriftiness of the birds. When culling, the following must be recorded:</p> <ul style="list-style-type: none"> <li>iv) number of birds;</li> <li>v) date; and</li> <li>vi) reason for culling (see 3.4.1).</li> </ul> <p>Data will be summarized as follows:</p> <ul style="list-style-type: none"> <li>i) day 1 – 7;</li> <li>ii) day 8 – TW1; and</li> <li>iii) day after TW1 – end of trial</li> </ul>
	Morbidity	Whole pen (count)	Whole pen (count)	<p>Measuring incidence of sickness/illness. If birds become sick/ill, the following must be recorded:</p> <ul style="list-style-type: none"> <li>i) number of birds;</li> <li>ii) date;</li> <li>iii) diagnosis;</li> <li>iv) treatment; and</li> <li>v) outcome of treatment.</li> </ul> <p>NOTE: treatment does not stop the trial if illness is treatable.</p>
Foot Health	Foot pad dermatitis	Whole pen (recording male or female with each measurement)	Whole pen (recording male or female with each measurement)	Measuring incidence and severity of foot ulcers at TW1 and TW2 (see Appendix I).
Leg Health and Mobility	Valgus/Varus	Whole pen (recording male or female with each measurement)	n/a	Measuring outward and inward measures of angulation (deformity) of right leg as described by Leterrier and Nys (1992) and (see Appendix VI for Valgus-Varus angulation score)
	Gait score	Whole pen (recording male or female with each measurement)	n/a	Measuring mobility at TW1 and TW2 (see Appendix IV).

	Hock burn	Whole pen (recording male or female with each measurement)	n/a	Measuring hock ulcers at TW1 and TW2 (as described in Welfare Quality®, Assessment Protocol for Poultry, 2009) (see Appendix VII)
Environment	Litter moisture	Each pen	Each pen	Measuring the condition of the litter (see Appendix II).
	Environmental Comfort	Each pen	Each pen	Measuring environment of the birds.
Production Performance	Growth	Whole pen (recording male or female with each measurement)	Whole pen (recording male or female with each measurement)	Individual bird weights recorded weekly plus daily as birds approach TW1 and TW2 and day of processing.
	Feed intake	Each pen	Each pen	Weight of feed provided minus weight of feed left, measured weekly (or as necessary if feeders do not hold 1 weeks' worth of feed) at the same time with spillage.
	Feed Conversion Ratio (FCR)	Each pen	Each pen	FCR must be calculated weekly, and at TW1 and TW2.

## SECTION 5: DATA ANALYSIS

- 5.1.1 For each parameter in Table 3, the Facility must keep all the raw data organized in the excel spreadsheets provided by G.A.P. Raw data must be maintained, managed and stored according to the requirements detailed in G.A.P.'s Facility Accreditation Program.
- 5.1.2 For each parameter in Table 3, Facilities will summarize the data and calculate average means and standard error of the means by pen, sex, trial, and pooled trial data for both Control and Test birds at each of the target weights and other specified points.
- 5.1.3 Summarized data will be provided to Dr. Laura Dixon at Scottish Rural Agricultural College (SRUC), G.A.P.'s accredited independent third party, who will be responsible for all data analysis. The Facility will provide raw data to Dr. Dixon upon request.
- 5.1.4 No comparative analysis will be conducted between the Control and Test bird data. Instead, pooled means (i.e., data from trials 1 and 2 combined) for the Test bird only, will be compared to the thresholds for TW1 and TW2 listed in Appendix VIII. The pooled means for each criterion at each TW will be assigned a score depending on how it compares to the set thresholds and an estimated standard error of the mean (SEOM). Data scores will be

summarized for TW1 and TW2 and assigned an additional weighting, then the totals for all categories will be summed to yield a score out of 10 (see Appendix VII). This score will then be translated into a percentage. Appendix IX illustrates an example of how data for a test breed will be analysed and scored.

- 5.1.5 Temperature, RH, litter moisture, growth, feed intake and FCR will be analysed by the G.A.P. accredited independent third party to assess any between-pen or between trial variation for the Control and Test breeds.

## **SECTION 6: DETERMINATION OF BREED ELIGIBILITY**

- 6.1.1 All breeds accepted for use under G.A.P.'s 5 Step® Animal Welfare Standards for Chickens Raised for Meat must be initially assessed\* according to the protocol detailed within this document.

\*Breeds trialled within the University of Guelph study will be assessed to this protocol using the results from the Guelph study on all measures where results have been reported by the research team. Any breeds trialled within the Guelph study that are approved by G.A.P. and listed as eligible for use in the G.A.P. Program will not need to be retested until 2026 unless there is evidence of major issues with the welfare outcomes collected as part of G.A.P. Certification field data.

- 6.1.2 The G.A.P. accredited independent third party conducting the analysis will submit a report and analysis table to G.A.P., and the associated primary breeding company(ies), for each breed tested.
- 6.1.3 A breed scoring 80.0% or higher, calculated using the table in Appendix VIII will be deemed eligible for use in the G.A.P Program.

## **SECTION 7: ELIGIBLE BREEDS**

- 7.1.1 All eligible breeds will be communicated in G.A.P.'s 5-Step® Animal Welfare Program for Meat Chickens in Appendix I of the standard and also on the G.A.P. website (available at [www.globalanimalpartnership.org/standards/chickens](http://www.globalanimalpartnership.org/standards/chickens)). Eligible breeds will be communicated as a cross from 'X' female and 'Y' male.
- 7.1.2 Following initial assessment using the protocol in this document and written acceptance of the breed by G.A.P., test and control breeds will need to be re-assessed according to this same protocol at least by every eighth (8<sup>th</sup>) year following the previous assessment and approval, or sooner if there is evidence to suggest the welfare of the breed has deteriorated or the breed company has made significant changes to genetics since its last assessment.

7.1.3 Every breed/cross/hybrid needs to be tested in order to be assessed for eligibility.

① A breed/cross/hybrid is defined by the grandparent stock. For example, a commercial broiler is the offspring of the mating of parent stock AxB crossed with parent stock CxD. If either A, B, C or D is adjusted by the primary breeding company, the resulting breed/cross/hybrid must be retested.

#### References cited:

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## Appendix I: Foot Pad Dermatitis (FPD) Score

From: *G.A.P.'s 5-Step® Animal Welfare Standards for Chickens Raised for Meat v3.2*

For each bird in each pen at TW1, both paws must be scored using the 3-point score below, with the sex of the bird also being recorded. This is repeated at TW2. At TW 1 there will be 100 FPD scores for each pen (i.e., 50 birds x 2 paws). At TW2, there will be 80 FPD scores for each pen (i.e., 40 birds x 2 paws).

Score: 0	Score: 1	Score: 2
(0 points each for score of 0)	(1 point each for a score of 1)	(2 points each for a score of 2)
<ul style="list-style-type: none"> <li>• No lesions or very small</li> <li>• No discoloration or slight on a limited area</li> <li>• No hyperkeratosis or mild</li> <li>• Old or no scars</li> </ul>	<ul style="list-style-type: none"> <li>• Mild and/or superficial lesions</li> <li>• Substantial discoloration on the footpad</li> <li>• Dark papillae, no ulceration</li> </ul>	<ul style="list-style-type: none"> <li>• Severe and significant lesions</li> <li>• Ulceration</li> <li>• Dark papillae and ulceration</li> <li>• Abscesses and/or swollen feet (bumble foot)</li> </ul>
<p><b>no lesion</b></p> 	<p><b>mild lesion</b></p> 	<p><b>severe lesion</b></p> 
<p><b>small discoloration</b></p> 	<p><b>substantial discoloration</b></p> 	<p><b>dark papillae and ulceration</b></p> 



**completely healed scar****dark papillae, no ulceration****abscess, swollen (bumble foot)**

Adapted and reprinted with permission: "Foot-pad dermatitis in broilers: a photo guide to broiler foot health classification." Dr Lotta Berg, Swedish University of Agricultural Sciences, Sweden

## Appendix II: Litter Condition Score

From: *G.A.P.'s 5-Step® Animal Welfare Standards for Chickens Raised for Meat v3.2*

Litter condition is to be scored daily, at the same time each day, in each pen.

Scoring Litter Quality			Action Required?
<b>0</b>	<b>DRY</b>	Dry and crumbly, free flowing on compression (will not form a ball or clod)	<b>No action required</b>
<b>1</b>	<b>MOIST</b>	Sticky on hand when compressed, clod forms but does not hold – crumbles when released from compression	<b>No action required</b>
<b>2</b>	<b>WET</b>	Forms a clod when compressed that holds form when released from compression	<b>Yes – add more litter and note the quantity provided (see 3.1.2 for more information)</b>
<b>3</b>	<b>VERY WET</b>	Litter is noticeably wet, moisture comes out of it on compression.	

## Appendix III: Acceptable Euthanasia Methods

From: *G.A.P.'s 5-Step® Animal Welfare Standards for Chickens Raised for Meat v3.2*

### Standard 1.5.7

Methods of euthanasia are listed below, where YES indicates an acceptable method and NO indicates an unacceptable method. Chickens must be appropriately held or restrained as necessary to ensure the euthanasia method can be properly and safely administered.

METHOD	ACCEPTABILITY
Manual cervical dislocation (i.e., use of hands only to dislocate the neck as near to the head or skull as possible)	YES
Penetrating captive bolt pistol <sup>1</sup>	YES
Non-penetrating captive bolt pistol <sup>1</sup>	YES
Electrical stun knife <sup>1</sup> (only permitted if chickens are stunned prior to cutting the neck)	YES
Gas stunning and killing systems <sup>1</sup> using (1) multi-phase carbon dioxide <sup>2</sup> , (2) argon, (3) nitrogen, or (4) a mixture of these gases	YES
Veterinarian administered overdose of injectable anaesthetics, including barbiturate and barbituric acid derivatives	YES
Mechanical cervical dislocation (i.e., equipment that pulls/crushes the neck such as wringers or poultry pliers or handheld cervical dislocators)	NO
Manually applied blunt force trauma to the head	NO
Decapitation	NO
Bleeding/slitting the throat without pre-stunning	NO
De-braining (inserting a sharp implement through the roof of the chicken's mouth into its brain)	NO
Gas stunning and killing systems using carbon monoxide	NO

<sup>1</sup>Only permitted if used to the manufacturer's specifications.

<sup>2</sup>Multi-phase carbon dioxide systems must have at least two phases where the first phase has a lower concentration of carbon dioxide to render the chickens unconscious before higher levels of carbon dioxide are introduced.

## Appendix IV: 3-Category Lameness Evaluation

From: *G.A.P.'s 5-Step® Animal Welfare Standards for Chickens Raised for Meat v3.2*

This 3-category lameness evaluation is to be used to assess and score the mobility of all chickens within a pen at TW1 and TW2. Each bird in each pen must be scored using the below 3-point scale. The proportion of birds in each category, by sex (male or female), is to be recorded.

Score: 0	Score: 1	Score: 2
<b>(0 points each for score of 0)</b>	<b>(1 point each for a score of 1 if one or more of the descriptions below are seen)</b>	<b>(2 points each for a score of 2 if one or more of the descriptions below are seen)</b>
<ul style="list-style-type: none"> <li>• Foot may or may not curl when lifted by the chicken</li> <li>• Smooth gait typically with even steps that may be uneven at times</li> <li>• Well-balanced</li> <li>• Able to walk quickly and/or run</li> <li>• Difficult to identify any abnormality when walking or running</li> </ul>	<ul style="list-style-type: none"> <li>• Uneven gait</li> <li>• Foot does not curl when lifted by the chicken</li> <li>• Irregular, short strides</li> <li>• Poor balance</li> <li>• The chicken:               <ul style="list-style-type: none"> <li>○ may use one or both wings to help balance while walking</li> <li>○ squats within 15 seconds of standing or being forced to move by gentle nudging</li> <li>○ may lie down after several steps</li> </ul> </li> </ul>	<p>The chicken:</p> <ul style="list-style-type: none"> <li>• is reluctant or unable to move, or shuffles on the ground if forced to move by gentle nudging</li> <li>• uses wings to help with movement</li> <li>• takes at most a few steps, if any</li> </ul>
<b>Normal</b>	<b>Moderately Lamé</b>	<b>Severely Lamé</b>

## Appendix V: Muscle Myopathies

Carcasses must be chilled to 4 °C (40 °F) and aged for 2 hours prior to removing the breast meat.

Both breasts for each bird must be scored, with the sex of the bird also being recorded. Per Table 3, 10 birds (5 male + 5 female) per pen must be scored at TW1. This repeated at TW2. At each TW there will be 20 scores for wooden breast and 20 scores for white striping recorded per pen.

Each breast must be scored using each of the 4-point scales below at the same time (i.e., each chicken breast is scored for Wooden Breast, and then White Striping prior to moving on to the next breast).

**Wooden (or Woody) Breast** measured using the 4-point scale (Cruz et al., 2017):

Scale	Description
0	None; normal breast without any detectable hardness or paleness
1	Mild; hardness affecting the cranial area, or caudal area of the breast; not covering more than one third (1/3) of the filet
2	Moderate; hardness affecting up to two thirds of the breast muscle throughout the filet
3	Severe; hardness affecting the majority of the breast and with the presence of haemorrhage on the surface

**White Striping** measured using the 4-point scale (Kuttappan et al., 2016):

Scale	Description
0	None; normal breast without any striation
1	Moderate; striations of less than 1mm thickness on the surface of the breast
2	Severe; striations of 1-2mm thickness covering the breast and very visible on the filet surface
3	Extreme; striations thicker than 2mm thickness throughout the filet, covering the majority of the breast

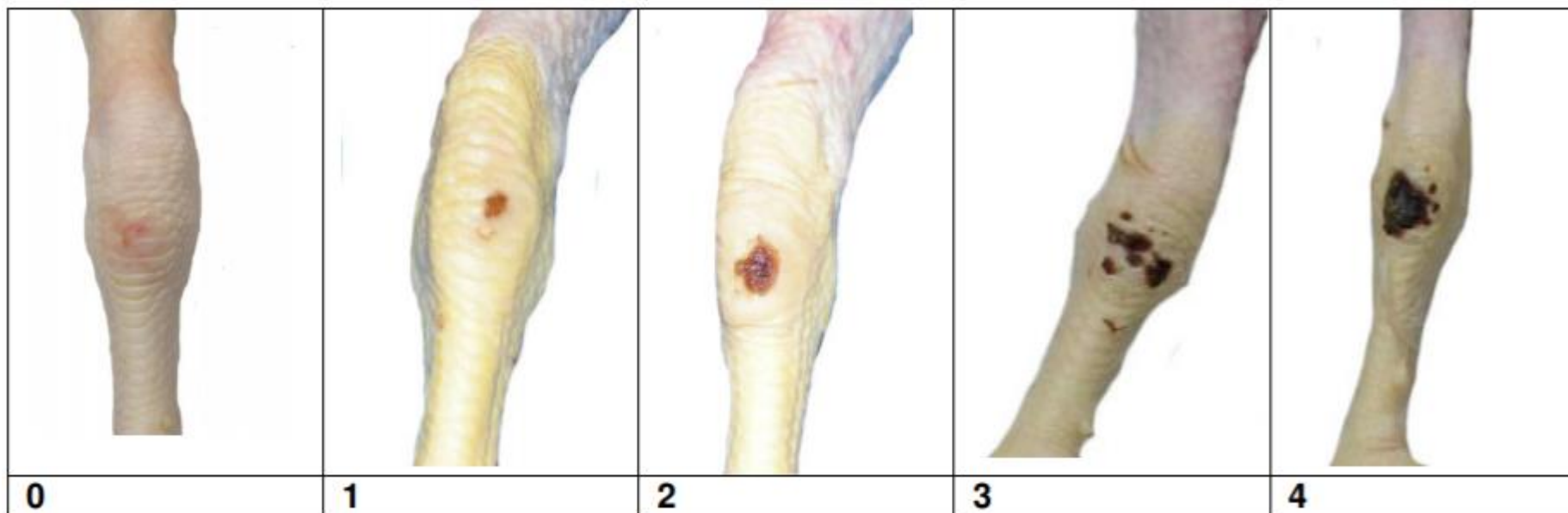
## Appendix VI: Valgus-Varus Score

This 4-category evaluation is to be used to assess and score the angulation of the right leg of all chickens within a pen at TW1 and TW2. Each bird in each pen must be scored using the below 4-point scale as described by Leterrier and Nys (1992). The proportion of birds in each category, by sex (male or female), is to be recorded.

Score	Description	Angle between Tibiotarsus and Metatarsus
0	Normal	0 to <10°
1	Mild	10° to 25°
2	Intermediate	25° to 45°
3	Severe	>45°

## Appendix VII: Hock Burn Score

This 5-category hock burn evaluation is to be used to assess and score the incidence and severity of hock burn of all chickens within a pen at TW1 and TW2. Each bird in each pen must be scored using the below 5-point scale. The proportion of birds in each category, by sex (male or female), is to be recorded. Severe hock burns are classified as any hocks scoring score 3 or 4.



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From, with permission: Welfare Quality®. 2009. Welfare Quality® assessment protocol for poultry (broilers, laying hens). Welfare Quality® Consortium, Lelystad, Netherlands. Chapter 5.1A.3 Good Health, 5.1A.3.1 Absence of injuries.

## Appendix VIII: Thresholds

Only the following measures from Table 3 (in Section 4) will have thresholds that the Test breed will be compared against. Other measures listed in Table 3 (in Section 4) will be collected for informational purposes and to inform the trial analysis, as necessary.

Category Grouping	Measure	Threshold at TW1	Threshold at TW2
Behavior	On straw bale (% of birds on the straw bale)	8.00	8.00
Behavior	Obstacle Test (number of crossings)	7.00	7.00
Behavior	On the perch	For information only	For information only
Carcass Quality	Wooden Breast (% severe)	10.00	15.00
Carcass Quality	White Striping (% severe)	5.00	10.00
Mortality & Culls	Mortality 8 days to TW1	2.50	-
Mortality & Culls	TW1 – END	-	2.50
Mortality & Culls	Culls to TW1	5.00	-
Mortality & Culls	Culls TW1 – TW2	-	2.50
Foot Health	FPD % Score 1 (mild)	35.00	45.00
Foot Health	FPD % Score 2 (severe)	0.00	0.00
Leg health	Valgus-Varus Angulation (% score 2 and 3)	0.00	0.00
Leg health	Gait Score (% Score 1)	20.00	25.00
Leg health	Gait Score (% Score 2)	0.00	0.00
Leg health	Hock Burn (% Score 1+2)	15.00	20.00
Leg health	Hock Burn (% Score 3 + 4)	0.00	0.00



## Appendix IX: Analysis Table

This table is used to summarize the data collected from the protocol.

Category Grouping	Weighting (%)	Measure	Target Weight 1 (TW1)					Target Weight 2 (TW2)					TOTAL SCORE TW1 + TW2		
			Threshold	Estimated SEM <sup>1</sup>	Value from Trials	Sub-total Score TW1	Total Grouping Score TW1	Weighted Score TW1	Threshold	Estimated SEM <sup>1</sup>	Value from Trials	Sub-total Score TW2		Total Grouping Score TW2	Weighted Score TW2
Behavior	22.5	On straw bale	8.00	0.75			(Sum of Behavior Sub-totals Scores)/2	Total grouping score x 22.5%	8.00	0.50			(Sum of Behavior Sub-totals Scores)/2	Total grouping score x 22.5%	TW1 Total grouping score + TW2 total grouping score
		Obstacle Test	7.00	0.98					7.00	0.93					
		On the perch	FOR INFORMATION	-					FOR INFORMATION	-					
Carcass Quality	22.5	Wooden breast (% severe)	10.00	2.72			(Sum of Carcass Quality Sub-totals)/2	Total grouping score x 22.5%	15.00	2.76			(Sum of Carcass Quality Sub-totals)/2	Total grouping score x 22.5%	Total grouping score + TW2 total grouping score
		White Striping (% Severe)	5.00	2.30					10.00	2.33					
Mortality & Culls	22.5	8 days to TW1	2.50	0.37			(Sum of Mortality and Culls sub-totals)/2	Total grouping score x 22.5%	-	-	-	-	(Sum of Mortality and Culls sub-totals)/2	Total grouping score x 22.5%	Total grouping score + TW2 total grouping score
		TW1 - END	-	-	-	-			2.50	0.37					
		culls (to TW1)	5.00	0.21					-	-	-	-			
		culls (TW1 - TW2)	-	-	-	-			2.50	0.21					
Foot Health	10	FPD % Score 1 (mild)	35.00	4.66			(Sum of Foot Health sub-total scores)/2	Total grouping score x 10%	45.00	4.82			(Sum of Foot Health sub-total scores)/2	Total grouping score x 10%	Total grouping score + TW2 total grouping score
		FPD % Score 2 (severe)	0.00	1.92					0.00	2.69					
Leg Health	22.5	Valgus/Varus Angulation (% score 2 and 3)	0.00	0.50			(Sum of Leg Health sub-total scores)/5	Total grouping score x 22.5%	0.00	0.50			(Sum of Leg Health sub-total scores)/5	Total grouping score x 22.5%	Total grouping score + TW2 total grouping score
		Gait Score (Score 1)	20.00	0.50					25.00	0.50					
		Gait Score (Score 2)	0.00	0.50					0.00	0.50					
		Hock Burn (%mild)	15.00	3.99					20.00	5.09					
		Hock Burn (%severe)	0.00	1.15					0.00	1.24					
<b>GRAND TOTAL</b>													<b>0.00</b>		

The average means from the pooled trial 1 and 2 data are entered in the column denoted 'Values from the trials' for both TW1 and TW2. These values are then scored against the thresholds listed in the table. Test breeds can earn partial scores if they are within 1-3 estimated standard errors of the mean\* as follows:

\*estimated SEMs were calculated from UofG research values and from other reviews of the literature.

**SCORING KEY:**

Value	Criteria
5	At or <u>below</u> the threshold for carcass quality, mortality and culls, foot health, and leg health. OR At or <u>above</u> the threshold for behavior.
3	Between the threshold and 1 estimated SEM.
1	Between 1 estimated SEM and 2 estimated SEMs.
0	Between 2 estimated SEMs and 3 estimated SEMs.
-1	>3 estimated SEMs.

See following page for example of table with **mock data**

## Appendix IX: Example

Category Grouping	Weighting (%)	Measure	Target Weight 1 (TW1)						Target Weight 2 (TW2)						TOTAL SCORE TW1 + TW2
			Threshold	Estimated SEM <sup>1</sup>	Value from Trials	Sub-total Score TW1	Total Grouping Score TW1	Weighted Score TW1	Threshold	Estimated SEM <sup>1</sup>	Value from Trials	Sub-total Score TW2	Total Grouping Score TW2	Weighted Score TW2	
Behavior	22.5	On straw bale	8.00	0.75	<b>8.23</b>	<b>5</b>	5	1.13	8.00	0.50	<b>7.29</b>	<b>1</b>	1	0.23	1.35
		Obstacle Test	7.00	0.98	<b>7.40</b>	<b>5</b>			7.00	0.93	<b>5.7</b>	<b>1</b>			
		On the perch	FOR INFORMATION	-	<b>2.1</b>	-			FOR INFORMATION	-	<b>1.98</b>	-			
Carcass Quality	22.5	Wooden breast (% severe)	10.00	2.72	<b>31.82</b>	<b>-1</b>	-0.50	-0.11	15.00	2.76	<b>64.03</b>	<b>-1</b>	-1	-0.23	-0.34
		White Striping (% Severe)	5.00	2.30	<b>11.70</b>	<b>0</b>			10.00	2.33	<b>27.95</b>	<b>-1</b>			
Mortality & Culls	22.5	8 days to TW1	2.50	0.37	<b>1.99</b>	<b>5</b>	5	1.13	-	-	-	-	5	1.13	2.25
		TW1 - END	-	-	-	-			2.50	0.37	<b>1.99</b>	<b>5</b>			
		culls (to TW1)	5.00	0.21	<b>0.85</b>	<b>5</b>			-	-	-	-			
		culls (TW1 - TW2)	-	-	-	-			2.50	0.21	<b>0.85</b>	<b>5</b>			
Foot Health	10	FPD % Score 1 (mild)	35.00	4.66	<b>67.50</b>	<b>-1</b>	-0.50	-0.05	45.00	4.82	<b>47.70</b>	<b>3</b>	1	0.10	0.05
		FPD % Score 2 (severe)	0.00	1.92	<b>5.25</b>	<b>0</b>			0.00	2.69	<b>18.30</b>	<b>-1</b>			
Leg Health	22.5	Valgus/Varus (% score 2 and 3)	0.00	0.50	<b>6.00</b>	<b>-1</b>	2.60	0.59	0.00	0.50	<b>8.20</b>	<b>-1</b>	0.20	0.05	0.63
		Gait Score (Score 1)	20.00	0.50	<b>12.00</b>	<b>5</b>			25.00	0.50	<b>14.00</b>	<b>5</b>			
		Gait Score (Score 2)	0.00	0.50	<b>4.80</b>	<b>-1</b>			0.00	0.50	<b>1.90</b>	<b>-1</b>			
		Hock Burn (%mild)	15.00	3.99	<b>12.50</b>	<b>5</b>			20.00	5.09	<b>36.90</b>	<b>-1</b>			
		Hock Burn (%severe)	0.00	1.15	<b>0.00</b>	<b>5</b>			0.00	1.24	<b>4.16</b>	<b>-1</b>			
GRAND TOTAL														<b>3.94</b>	

To help illustrate how the scoring is calculated using the estimated SEMs, below are two examples from the above table.

Example 1:

Trial value for mortality from 8 days of age to TW1 was 1.99%. The threshold was 2.50%. Because the trial value was 1.99%, which is **below the threshold, a score of 5 was assigned to this measure.**

Example 2:

Trial value for severe wooden breast at TW2 was 64.03%. The threshold was 15.00%, with an estimated SEM of 2.76.

To obtain a score of 5, the trial value for severe wooden breast would need to be at or below the threshold. The trial value is >15%, so a score of 5 is not assigned.

To obtain a score of 3, the trial value would need to be between 15 and 17.76 (1 estimated SEM). The trial value is >17.76, so a score of 3 is not assigned.

To obtain a score of 1, the trial value would need to be between 17.76 and 20.52 (2 estimated SEMs). The trial value is >20.52, so a score of 1 is not assigned.

To obtain a score 0, the trial value would need to be between 20.52 and 23.28 (3 estimated SEMs). The trial value is >23.28, so a score of 0 is not assigned.

To obtain a score of -1, the trial value would need to be >23.28. **Since the trial value is 64.03, a score of -1 is assigned to this measure.**

**This Test breed scored 3.94/10, or 39.4%, and is therefore, not eligible for the G.A.P. Program**