INFLUENCE OF CARCASS PARTS, SEX AND FEED LEVEL ON DRESSING PERCENTAGE IN GROWING PIGS AT VARYING LIVE WEIGHTS

L.R. GILES* and R.D. MURISON*

SUMMARY

Regression coefficients for dressing percentage and percent carcass parts of pigs were calculated as functions of live weight from 45 to 120 kg. The average dressing percentage for males (79.70%) was 0.97% less than for females (80.67%). Compared to female carcasses, male carcasses had less flare fat and increased kidney and trotter weights at all live weights. Feed restriction decreased dressing percentage and flare fat percent but increased the percent weight of head plus jowls, trotters and ears plus eyelids. Carcass weight loss following 24 hours chilling at 0°C averaged 2.52% over all live weights.

INTRODUCTION

Consignment selling of pigs on the basis of carcass weight and backfat thickness has expanded in Australia over recent years. Currently pig carcass dressing procedures differ between Australian abattoirs and these differences cause difficulty in comparing consignment prices per kg carcass weight.

With the exception of McMeekan's (1940a,b and c) detailed dissection studies, little attention has been given in the literature to the influence of dressing procedures, sex, feed level and live weight at slaughter on dressing percentage.

This paper reports the percentage weight of carcass parts removed during the dressing procedures of male and female pigs, fed differing feed levels and slaughtered at varying live weights.

MATERIALS AND METHODS

Two replicates each containing 48 pure bred Large White pigs were divided according to sex, four feed levels and six slaughter weights (45, 60, 75, 90, 105, 120 kg) and individually penned in a fully slatted shed equipped with fan ventilation and heated to maintain a minimum temperature of 21°C.

The diet components included 75.5% wheat, 21.0% solvent extracted soya bean meal, 3.0% bone flour, 0.25% salt and 0.25% mineral-vitamin supplement (Minavit). The diet was formulated on an air-dry basis and contained 19.8% crude protein (N x 6.25), 0.92% lysine, 14.0 MJ digestible energy (DE)/kg. The four feed levels offered were ad libitum (ad lib.); the Agricultural Research Council (ARC) (1967) recommended daily DE intake (C); ARC (1967) minus 12.5% daily DE intake (C - 12.5%); and ARC (1967) minus 25% daily DE intake (C - 25%).

The experimental diet and feed levels were introduced at 25 kg live weight and when 'full' live weight exceeded the designated slaughter weight, feed was removed (water provided) for 18 to 20 hours prior to slaughter to record 'empty' live weight (LWT). Hot carcass weight (HCW) was measured within one hour of slaughter to record dressing percentage (HCW/LWT x 100). After removal of hair and scurf, viscera (other than kidneys), ears plus eyelids, genital

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organ, diaphragm, urinary bladder and hooves, the hot carcass included trotters, head, tail, cavity fat (flare fat) and kidneys.

LWT and HCW were weighed on clock-face balances to the nearest 0.1 kg while the weight of each carcass part was weighed on an electronic balance to the nearest g. Each day prior to weighing the accuracy of each balance was checked with standard weights. Before measuring HCW the following carcass parts were removed from the carcass and their weights were expressed as a percentage of HCW (carcass parts + HCW/HCW x 100).

(i) Ears plus eyelids The ears plus eyelids were removed from the hanging carcass starting as a cut at the caudal base of the pinna proceeding forward including the skin between each ear and eye and the upper and lower eyelids.

(ii) Diaphragm The diaphragm consisted of the muscular part of the diaphragm which remained following evisceration.

(iii) Male parts The male parts included the penis plus prepuce to the level of its roots, the scrotum and testicles plus the tunica vaginalis and epididymis.

Following overnight chilling at 0°C for 24 hours, cold carcass weight and the weights of the following carcass parts were recorded and expressed as a percentage of HCW (carcass parts/HCW x 100).

(i) Head plus jowls The head plus jowls were removed from the hanging carcass at a cut level with the atlanto-occipital joint.

(ii) Jowls The jowls were removed from the head at a cut which followed the ventral surface of the mandibles.

(iii) Flare fat The flare fat included the perirenal and the retro-peritoneal fat.

(iv) Kidneys All perirenal fat was removed from the kidneys and the ureter was trimmed to the level of the hilus.

(v) Front trotters The front trotters were removed at a cut through the carpo-metacarpal joint.

Analysis of variance examined treatment means due to live weight, feed level, sex and all interactions. Regression analysis of treatment means was used to present predicted values at 45 kg and 90 kg live weight.

RESULTS

Predicted values and regression coefficients of dressing percentage and carcass parts as functions of live weight are presented in Table 1. The percentage weight of carcass parts removed prior to measuring HCW are shown as greater than 100% while the percentage weight of carcass parts removed after measuring HCW are less than 100%. Significant live weight by sex interactions occurred for flare fat, trotters, kidneys and male parts. Dressing percentage increased from 77.18% at 45 kg to 80.78% at 90 kg live weight while the average dressing percentage for males (79.70%) was 0.97% less (P < 0.05) than for females (80.67%). Jowls (average 2.63%) and cold carcass weight (average 97.48%) were unaffected by live weight or sex. The percentage weight of other carcass parts decreased with increase in live weight with the exception of male parts and flare fat. Male parts increased to 101.32% at 90 kg live weight while compared to males, females
TABLE 1  Predicted values and regression coefficients of dressing percentage and carcass parts (%) as functions of live weight (kg)

<table>
<thead>
<tr>
<th></th>
<th>Coefficients (S.E.)</th>
<th>Predicted Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\hat{a})</td>
<td>(\hat{b}_1)</td>
</tr>
<tr>
<td>Dressing %</td>
<td>73.58</td>
<td>0.080</td>
</tr>
<tr>
<td>Head + jowls</td>
<td>12.40</td>
<td>-0.082</td>
</tr>
<tr>
<td>Cold carcass</td>
<td>2.63</td>
<td></td>
</tr>
<tr>
<td>&quot;V&quot; + necks</td>
<td>97.48</td>
<td></td>
</tr>
<tr>
<td>&quot;V&quot; + eyelids</td>
<td>101.80</td>
<td>-0.014</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>100.62</td>
<td>-0.0010</td>
</tr>
<tr>
<td>Male parts</td>
<td>100.62</td>
<td>0.0078</td>
</tr>
<tr>
<td>Flare fat (M)</td>
<td>-0.53</td>
<td>0.037</td>
</tr>
<tr>
<td>(F)</td>
<td>-0.57</td>
<td>0.035</td>
</tr>
<tr>
<td>Trotters (M)</td>
<td>1.37</td>
<td>-0.030</td>
</tr>
<tr>
<td>(F)</td>
<td>1.29</td>
<td>-0.0144</td>
</tr>
<tr>
<td>Kidneys (M)</td>
<td>0.57</td>
<td>-0.0039</td>
</tr>
<tr>
<td>(F)</td>
<td>0.51</td>
<td>-0.0036</td>
</tr>
</tbody>
</table>

M - males; F - females.
\(a\) - intercept; \(b_1\) - linear coefficient; \(b_2\) - quadratic coefficient.

TABLE 2  Means of dressing percentage and carcass parts (%) for each food level group

<table>
<thead>
<tr>
<th></th>
<th>Feed level group</th>
<th>S.E.</th>
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<tr>
<td></td>
<td>(a d) lib</td>
<td>(c)</td>
</tr>
<tr>
<td>Dressing %</td>
<td>73.58</td>
<td>79.84c</td>
</tr>
<tr>
<td>Head + jowls</td>
<td>12.40</td>
<td>8.33a</td>
</tr>
<tr>
<td>Trotters</td>
<td>0.93c</td>
<td>1.01a</td>
</tr>
<tr>
<td>Flare fat</td>
<td>2.63c</td>
<td>1.90a</td>
</tr>
<tr>
<td>Ears + eyelids</td>
<td>101.80</td>
<td>101.08a</td>
</tr>
</tbody>
</table>

* \(p < 0.05\); ** \(p < 0.01\) indicates significant difference between treatments.
† Within rows means not sharing the same superscript differ significantly.
Animal production in Australia

had 0.50% more flare fat at 90 kg live weight. Males had increased percent
trotters and kidneys at all live weights.

Significant effects of feed level on dressing percentage and carcass parts
are presented in Table 2. Additional feed restriction from C to C - 25%
decreased flare fat by 0.47% and increased head plus jowls by 0.74%.

DISCUSSION

The results presented in this paper provide a basis for correcting the
weights of carcasses which vary from the hot carcass definition used in this
study and proposed by the Australian Commercial Pig Producers Federation
(ACPPF) (McAuliffe 1976). Compared to the ACPPF carcass definition, carcasses
dressed to the export specifications of the Handbook of Australian Meat (1974)
(head off, jowl retained, trotters off, kidneys and flare fat removed) could be
expected to have carcass weight reduced by approximately 9.0% at 90 kg live
weight.

The loss of 0.97% dressing percentage with males compared to females
agrees with the findings of Blair and English (1965). While this loss appears
due to the removal of male parts, the removal of flare fat during dressing
procedures could be expected to offset sex differences in dressing percentage.

While it is common practice to value carcasses after a 3.0% cold weight
deduction, the results of this study would agree with those of Gerrard (1977)
that 2.5% deduction after 24 hours chilling is a reasonable weight loss.

It is often difficult to compare dressing percentage values because of the
lack of information presented on gut fill and hot carcass definition. However
the high dressing percentage values recorded in this study agree with the
findings of Hammond and Murray (1937) and Skitsko and Bowland (1970). The
collection of more industry data may lead to a revision of the widely-used value
of 75% dressing percentage at 90 kg live weight.

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REFERENCES

AGRICULTURAL RESEARCH COUNCIL. (1967). "The Nutrient Requirements of Farm
Livestock. No. 3, Pigs". p. 82. (Agricultural Research Council:
London).


Publications: London).


Meat Board: Sydney).

Board: Sydney).
