MONITORING FEEDLOT PRODUCTION QUALITY IN THE PACKING HOUSE

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Many approaches can be used to monitor the disease status of herds. Routine inspection at packing houses of selected animals long has been an important component of health monitoring in swine and poultry. Before 1980, routine inspections of beef cattle typically were limited to monitoring liver abscesses. This paper describes one technique of conducting routine health inspection of cattle in a modern packing plant. This technique for gathering information in a packing plant has evolved over the past decade.

ROUTINE INSPECTION OF CATTLE FROM FEEDLOTS

Crucial to the success of inspection is a close working relationship with management and personnel at the packing plant. This must be attained before trying to inspect a set of cattle at a packing plant. The management and personnel should expecting you to arrive on the day of an inspection. They should know what you want to accomplish, and what samples you want to collect. If you and the packing plant supervisors are not prepared, your presence can jeopardize worker safety in a modern packing house that processes 300 animals an hour.

It is important for the USDA-FSIS Veterinary Medical Officer (VMO) and his inspectors to be familiar with your activities. If your activities interfere with their inspection of animals or contaminate animals, you will not only lose your welcome in the plant, but you may be held liable for loss of product.

Establish a list of objectives for each set of cattle inspected. Use the feedlot and cattle history to establish your objectives (measurements).

Standard pre-packer processing information:

- What is the description of the cattle?
- How many cattle will be involved in the inspection?
- Where did the cattle come from?
- What was their background before feedlot placement?
- What is the history of their performance in the feedlot?
- What is the history of problems in the feedlot?

It is useful to examine the cattle as a group and their records before entering the packing house. This pre-processing examination allows you to formulate a specific approach to gathering the information you need. It also allows you to have specific treatment information on individual animals you may need to look at, or information you may feel is important to share with the VMO.

Standard equipment needed to conduct a packing house inspection.

Approved hard hat	Protective clothing
Protective glasses	Protective ear plugs
Stopwatch	Sample bags and markers
Note cards	Waterproof ink pens
Sharp knife & sheath	Approved protective glove

Standard packing house inspection objectives:

Variation in animal frame size.....percent +/- 25 cm
Identification tags.....inspection verification
Implant retention.....rate
Implanting technique assessment.....rate
Hide defects (mud and brands).....rate, location, & severity
Carcass bruising.....rate, location, age, & severity
Carcass contamination from hides.....rate
Variation in carcass finish.....estimated +/- one yield grade
Abdominal adhesions.....rate, etiology, and severity
Liver abnormalities.....rate, etiology, and severity
Lung abnormalities.....rate, etiology, and severity
Heart abnormalities.....rate and etiology
Large/small intestinal abnormalities.....rate
Rumen abnormalities.....rate, etiology, and severity
Abomasal abnormalities.....rate, etiology, and severity
Reproductive abnormalities.....pregnancy, stagging and rate
Kidney abnormalities.....rate, etiology and severity
Carcass trim caused by adhesions.....severity
Carcass trim caused by injections.....rate, location, severity
Carcass retention.....rate

This list of measurements follows the order in which observations can be made as the animals progress through the packing plant.

SET OBJECTIVES

It is important to understand that cattle can move past an inspection site at the rate of five animals per minute and that the typical processing line holds less than 150 animals. When inspecting a group of 150 animals, the first animal processed will be in the cooler before the last animal enters the processing line. At certain inspection locations, it is possible to gather information on only some of the animals being processed. Based on your pre-processing examination and evaluation of the cattle, you probably can prioritize the appropriate measurements. While you will be able to collect data on all of the items listed, targeting specific measurements based upon clinical history is important.

You must estimate the rate of occurrence of each defect you expect to find before you can establish the number of observations to be taken associated with each objective. More observations will be required to accurately evaluate the defect incidence rate if the incidence rate is low. Analysis of your observations should also consider that animals do not come through the processing line in random order.

For general quality assurance inspections it is best to follow the first 30 to 60 animals from the beginning to the end of processing. This allows an overview of all possible defect areas. Except for implants and hide defects, you can back-track and make extended observations of other areas where quality defects were noted.

MAP THE CHAIN SPEED AND INSPECTION LOCATIONS IN A PACKING PLANT

It is important to know exactly where your inspection locations will be in a plant, exactly how many animals are between inspection locations, and exactly how long it takes an animal to get from one location to another. To collect data on specific targeted objectives, you must know exactly where each animal will be in the packing plant during processing.

It is even more important to know where to stand and how to stay out of the way of inspectors and packing plant workers. It is best to arrive at the packing plant one to two hours early. This gives you time to establish the proper inspection locations and note how to avoid interfering with inspectors or plant workers. You also may benefit from schedule changes at the packing house. Packing plants occasionally change the processing order on groups of cattle, but seldom will they advance the processing time more than two hours. By arriving early, you are less likely to miss the cattle you need to observe.

You can accurately determine the rate cattle are being processed (chain speed) by using your stopwatch. For example, the plant may say that they are processing an average of 270 animals per hour (4.5/minute). But if they are processing 280 animals per hour (4.7/minute), you could miss important information because you overestimated the time you would have between inspecting implants and inspecting lungs. You must know how many animals will be on the rail between inspection locations, and how long it takes an animal to get from one location to another. For example, if 23 animals are on the rail between the location you inspect lungs and the location you inspect larynxes, being off by 0.1 animals per minute could cause you to miss an important observation by six seconds.

Having made your plant speed and location map, and knowing the number of cattle in the group you are to inspect, you can establish how many animals you have time to observe at each location. Start your stopwatch when you begin inspecting, record the number of defects, and calculate the rate of defects based on the observed defects per time. For example, if the chain is moving past you at 5.2 animals per minute, and if you observe five implants abscessed in 12 minutes, the abscess rate would be [5/(5.2*12)] or [5/62.4] 8 percent. During an inspection, you need only record the defects per location and the time spent at the location.

You can simultaneously collect data on several objectives if you are organized and have experience. For example, you can simultaneously collect: variation in frame size, implant technique, implant retention, and verification of animal identification. By getting to the packing plant early you can establish which objectives you can group at each location.

USDA-FSIS inspectors also keep track of selected defects. For example, USDA-FSIS inspectors count liver defects. If you are not concerned with critical evaluation of liver abscess severity, recording the beginning and ending liver abscess count on the cattle you are inspecting will provide you with the liver abscess rate for the cattle you inspected. Table 1 has is a form useful for collecting such observations.

THE REPORT

Remember, the data belong to the packing house. Although most packers do not want a copy of the data collected, they are concerned that the information is held in strict confidence. The good will and interest by packers in improving the quality of beef is what causes them to allow access to animals during processing.

After the inspection, your next call should be to the feedlot from which the cattle came for a conference with the manager to discuss your findings.

An example of a typical written report is presented in Table 2.. All data are summarized on the first page. These data can be included in the feedlots data base. It is useful to include comparative data from other cattle collected during the same period, (BASELINE DATA). Additional discussion detailing the analysis for each objective follows the summarized data. Feedlot managers find this portion of the analysis useful in their discussions with cattle owners.

PUTTING INSPECTION RESULTS TO WORK

Using the inspection technique described, and analyzing the reports allows managers to adjust their operations to improve carcass quality and properly assess sub-clinical disease. One of the most dramatic responses is locating sites of carcass bruises relating those to animal handling facilities. Adjustments can help control this costly problem. Validation of disease occurrence allows management to focus on problems specific to their feedlot.

NON-PERFORMING CATTLE

Populations of "Non-performing" cattle, cattle that do not gain weight at a rate similar to their pen mates, and "Normal-performing" cattle must be evaluated separately. The value of non-performing feedlot cattle typically is based on the animal's grade, yield, and final "rail" carcass weight. Data gathered on non-performing cattle often are called "grade and yield" or "railers" data.

The information from these two populations of cattle typically comes from two different sources. Most large packing plants are not designed to humanely handle cattle that weigh less than 400 kgs. Non-performing feedlot cattle frequently do not fit this constraint and instead are processed by smaller packers that have more flexibility in the size of animals they can accommodate. Additionally, non-performing feedlot cattle frequently have scars from a previous disease. Time is required to properly trim scars before the carcass is acceptable for marketing. Larger packing plants do not have the extra time to devote to properly handle and market carcasses from this class of cattle.

It is critical to check the production and health records of the non-performing animals to assure drug withdrawal compliance before sending them to a packer. Although the sensitivity and specificity of a urine antibiotic test are questionable, the test is an excellent screening tool.

The form we have used for collecting data from non-performing or grade & yield cattle is a shortened version of a check off necropsy form (Table 3).

FINAL THOUGHTS

Gathering useful information from packing house inspections of beef cattle was vital to the development of the first "Verified Production Control" program certified by the USDA-FSIS.

The packing houses involved in the early surveys were not fabricating carcasses. The problem of product loss associated with injection site damage, especially of normal-performing animals, has been identified since 1988. Packing houses were alerted to this problem when they began fabricating carcasses into wholesale cuts into "boxed beef." Relaying such information to feedyard personnel points out the value consulting feedlot veterinarians. They can serve both their feedlots and the beef feeding industry by establishing inspection protocols appropriate to the fabrication process.

Monitoring cattle at packing plants is extremely useful, not only to the feedlot, but the practicing veterinarian and nutritionist. It is an excellent way to detect and identify sub-clinical disease, both infectious and management, to assess health performance, and to monitor beef quality. Routine inspections provide useful information to the feedlot from which management decisions can be improved. Inspections provide the veterinarian with information which can help to improve disease management. Total Quality Management (TQM) is a popular phrase in the 90's. Few veterinary techniques will provide a better opportunity for TQM than to conduct packing plant inspections of feedlot cattle.

Table 1.

INSPECTION FORM Plant:_____ Date:_____ FL:_____

Chain sp:____.____/M	____.____/6M	/hr
Unique's	Id & # _____ /_____ Line-up #_____	Id & # _____ /_____ Line-up #_____
IN PIT #_____	Start time:	Start time:
HIDE:DIRT = +1 to +3 +1 = diffuse,+3= strip **BRANDS** (R/C)	------- ------- /	------- ------- /
IMPLANT(M, B, A) L/R **FSV** #_____ & eta_____	M / B / A ---------- time: FSV_____	M / B / A ---------- time: FSV_____
TRAC' / AGE #_____ & eta_____	/ time:	/ time:
BRUISE'(F, B, S) L/R **CFV** #_____ & eta_____	F: / B: / S: / time: CFV_____	F: / B: / S: / time: CFV_____
LUNG=AL/AD/BL/CD/P m +1 = <1, +2 = 1-3, +3 = 4-7, +4 = 8-11, +5 = >11% #_____ & eta_____	AL: AD: BL: CD: P +1 / / / / +2 / / / / +3 / / / / +4 / / / / +5 / / / / time: m=_____	AL: AD: BL: CD: P +1 / / / / +2 / / / / +3 / / / / +4 / / / / +5 / / / / time: m=_____
HEART'		
KIDNEY' (ws / n) #_____ & eta_____	ws n	ws n
ABOMAS'#____ & eta_____	ULS: PARA:	ULS: PARA:
RUMEN'#____ & eta _____	Scars: Fungus:	Scars: Fungus:
PREG'#_____ & eta_____	#: est wt:	#: est wt:
#_____ **L ABS** (pre)_____	Trims: Cont:	Trims: Cont:
#_____ **L DIS** (pre)_____		
#_____ **L TEL** (pre)_____		
#_____ **L PAR** (pre)_____		
#_____ **L CAR** (pre)_____		
#_____ **L CIR** (pre)_____		
#_____ **MISC** (pre)_____		

Table 2. Sample Inspection Report

TO: XXXXXXXX FROM: Dee Griffin, ...
XXXXXXXXX
XXXXXXXX

FOR: xxx heavy steers processed at Xxxxxxxxxxxx, Xxxxxxxxon, XX/XX/XX

This inspection included cattle that were processed in the plant preceding the targeted inspection cattle. Frame size variation (FSV), carcass finish variation (CFV), implants absorbed-missing-abscessed-bunched-embedded (IMP), liver abscess rates (LIVAB), fluke infestation (LIVFLK), intestinal adhesions (ADHES) and function, stomach parasites (PARA), rumen abnormalities (rumen), lung (LUNG) and trachea abnormalities (TRAC), kidney abnormalities (KID), carcass bruises (BRUS), hide damage from branding and mud (HIDE) and carcass injection trim (ITRIM) were examined.

INSPECTION RESULTS: PERCENT OF CATTLE OBSERVED
* The numbers in parenthesis are the total number of animals from the pen examined.

	161 CATTLE
FSV	15-20% (60)
CFV	10% (60)
IMP	5% Abs(60)
TRAC	0% (40)
BRUS	0% (60)
LUNG	10% (40)
HEART	5% (40)
PARA	25% (4)
RUMEN	less < 10%
PREG	----
KID	5% (40)
ADHES	4% (102)
LIVAB	13% (102)
LIVFLK	7% (102)
HIDE	No brands clean
ITRIM	0%

- Frame size variation (FSV) can be due to size sorting, genetic differences, and differences in animal performance caused by disease. FSV will correspond to problems with uniform quality and yield grading scores from the packer.

- Carcass finish variation (CFV) is most often associated with genetic differences among cattle; the number observed should be approximately the same as the number of FSV. CFV can be associated with animals sorting their ration. Animals that do not feel well may be more inclined to sort rations.

- Implants (absorbed, missing, abscessed, bunched, or embedded in cartilage) were checked. Bunching was the most common defect observed. Bunching is not a costly defect unless it is associated with formation of an abscess. 5% were abscessed and no implants were found in the remaining animals examined. Previous implants may have been completely absorbed.

- There were NO bruises.

- The liver abscess rate was higher in these cattle than in cattle observed from other groups (8-10 percent). Two were severe enough to cause skirt trim.

- The liver fluke infestation rate was above the national average. Several livers showed evidence of active infestation.

- Adhesions always are of particular interest due to their association with severe liver abscesses and hardware disease from metal-contaminated feed. Adhesions were no problem with this groups.

- There were a few white spots in the abomasum, but there was no thickening of the stomach wall and therefore not considered a problem. Parasites were not a problem in any of the other cattle inspected.

- There were only minor lesions in the lungs from previous pneumonia.

- The lesions in the kidneys were lower than typically observed. Kidney lesions for all cattle were lower than we have observed in the past.

- No injection lesions were found. The real problem with injection lesions occurs in fabrication and I was not able to establish the occurrence, if any, in these cattle. It will remain important for you to continue to use only the forequarters and neck for injections, avoiding the hind quarters if possible. Continue the use of subcutaneous injections for all animal health products when allowed by the F.D.A & U.S.D.A. approved labels. It is important to continue to use ONLY SUB Q CLOSTRIDIAL VACCINES.

Table 3.

GRADE & YIELD INSPECTION FORM

Date:_____ Animal & Pen ID_____

HISTO : BACT : TOX

Weight:(<4,5,6,7,8,>9) Sex(S,H,B) Breed(B,E,Z,D)
DOF:(1)0-7,(2)8-30,(3)31-60,(4)61-90,(5)91-150, (6)>150d
FL Dx&Rx _____ LAST NG:(Y/N)date:_____
AB:(SUL, TYL, OTC, AMP, PEN, ERY, NAX, SP, MICT)

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SUB Q: Icteric, Edema

LARYNX & TRACHEA: Abscessed, PseudoM

LUNG: Bil-Uni-Bro-Int,Fib, %Aff(<1/3,1/3-2/3,>2/3)
Severity(Mild,Mod,Sev), Age(<30D, >30d)

HEART: (Rt-Lf)-Abs-Epi-Endo-Myo-Peri-Val-Hem-(Ser-atr)-Tra

VESSELS: Jug-Pul-Aor-Por-Mes-Ext

Tong-Phary (ero-inflam-ulc-inj) 1st(7,12)M:2nd(12,18)M

ESOPHAGUS: Ero-Ulc-Inj-Para-Stri

RUMEN RETIC-OMAS: Pap-Wall(Adhes-ero-hemo-ulc-clump)

ABOMASUM: Ede-ero-Hemo-Ulc-Spot

SM:(Duo-Jej-Ili) & LG:(Cec-Col-Rec)

MEStry-OME-PERIT-SEROSA: Edema, Hemorrhage, Inflamed

LIV-PANC: Abs-Cong-spots-Scars GALLBLADDER: Casts

LY NODES (Hd-Cerv-Pul-Mes-Col): Ede-Hemo-Inflam-Swol

KID(R-L): Stk-Infar-Pal-Pet-Swol-Rough_cort_surf-Wh_spt

BLADDER-URETHRA:Dil-Exud-Hemo-Infl-Rupt

REPRO:Abnormal-Pregnant

FEET(For-Hind-Med-Lat): Foun-Infe(Jt-T)-Inj

BONES-JOINTS-TENDONS:Inj-Inf

MUS:Rt,Lf,Cer-FLeg-Tk-HdLeg-Ext:Hemo-Inf-Infl-Inject-Inju-Pal

ENDO:(Adr): Atrophy-Hemorrhage

BR-PIT-SP Cd-EYE(R-L)-EAR(R-L):Abs-Ede-Hem-Inf-Infl-Inj